

Emergence of conflicts in complex projects

**The role of informal versus formal governance mechanisms in
understanding interorganizational conflicts in the oil industry**

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Terje I.Våland:
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The role of informal versus formal governance mechanisms in understanding
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Abstract

This study is designed to explore conflict in buyer-seller relationships within complex projects. By focusing on conflict we can enhance our understanding of business relationships when these are put under pressure. The research problem is to find the basic reasons why conflict emerges within a technological and managerial complex environment.

The sources to conflict are expressed through two sets of governance mechanisms. Through the first, labeled informal governance mechanisms, the human factor and informal interaction are important ingredients. The second labeled formal governance mechanisms embraces procedures, contracts, and emphasize formal planning. This approach differs from contemporary studies of conflict in business relationships where the sources to conflict are mainly interpreted in terms of power differences between the parties.

The context is complex fabrication projects in the Norwegian oil industry supplied with one "non-project" from the same industry.

The industrial network approach is applied as a theoretical frame of reference. This implies that the project is considered strongly interrelated with third parties and interdependent with activity and resource structures across company boundaries.

The study raises two basic questions that are approached through two different methodologies, a variable analysis and a qualitative approach. The questions are both related to the sources to conflict. Variable analysis is carried out in stage one of the study, and the qualitative study in stage two.

The first basic research question (stage one):

When informants from the buyer's and the seller's side assess events of conflict in complex projects, to what extent do they associate conflict with formal versus informal governance mechanisms? In order to answer specific events of conflict are extracted from real business relationships. Based on perceptions from the buyer's and the seller's side conflict events are related to the two broad categories of governance mechanisms.

Empirical data is collected from three cases all controlled by Statoil. The cases include the Norne and the Siri fabrication projects, and a "non-

project"-case serving as a contrast to the projects. Events of conflict are identified and formulated based on archival studies supplied with unstructured key informant interviews. Secondly, the perceptions of the events are based on a survey methodology involving key informants from both sides, thus applying the dyad as unit of analysis. A total of 266 events are assessed leading up to a total of 738 observations.

The first phase of the study includes six questions pertaining to the relation between conflict events and the governance mechanisms. The first question raised is how the buyer and seller sides perceive the governance mechanisms in relation to the conflict events. This ended with four significant findings. Firstly, conflict events are significantly more associated with informal governance mechanisms than formal. In general both the seller and the buyer agree. Secondly, the buyer/seller perceptions separate more in the highly innovative Norne-project compared with the more straightforward Siri-project. This can be explained by differences in the distribution of risk between the parties. Thirdly, the seller side seems to go formal when the degree of innovation and functional risk is high, which is expressed through the Norne-case. From the buyer's perspective it is opposite with a shift towards the informal side.

Through the second question I wanted to find out whether there is any relationship between perceived importance of an event and the governance mechanisms. Here I find a significant relationship between the importance of a conflict event and formal governance perceived from the seller side. The higher perceived importance, the stronger association to formal governance mechanisms.

The remaining four questions addresses structural characteristics of the events, and relationship to the governance mechanisms. One of these is how the type of interdependencies characterizing the event is associated with the governance mechanisms. The most frequent one is the activity interdependencies, counting nearly half of the conflict events. In the project conflict in minor activities can easily initiate a domino effect leading up to severe and complex problems in the activity structure. This type of conflict has no significant relationship to either of the governance mechanisms

How does the existence of internal and external third parties relate to the governance mechanisms? I clearly see that active third parties do exist and play an important role both as a constraint and as a necessary resource in the buyer-seller relation. Secondly active third parties, at least as perceived by seller, call for a higher degree of formal governance, perhaps as a protection against disturbance.

Based on a classification of events in terms of hierarchical level, how does this relate to the governance mechanisms? The most interesting finding is that conflict events related to strategic issues are perceived as more oriented towards formal governance mechanisms than lower level events. Assuming that strategic issues as more important than other, this finding supports my previous finding that important events are skewed towards formal governance mechanisms.

Finally the importance of cultural distance was tested. A comparison between the Asian and Norwegian informant teams revealed no significant differences. On the other hand I am reluctant to conclude on this due to conceptual weaknesses.

The second basic research question (stage two):

The second stage is a qualitative study for exploring threats related to the most important mechanisms revealed in the first part of the study. The findings in stage one are used as a starting point for a discussion with a new set of informants in order reveal why the most significant governance mechanisms cannot prevent the emergence of conflict.

Within the industrial environment/network cultural distance between buyer and seller is one factor. This is closely related to the nation's trade history and prior experience in handling international business affairs. Industrial paradigms are regularly introduced, and sometimes these interfere with informal pattern already established. The oil price has an effect on the risk for financial loss in the project, with consequences for willingness to go informal with the other party. Finally competitive regulations may disturb long term relationships and thereby limiting informal governance.

The second dimension is the business atmosphere embracing the relationship. Three factors are specifically addressed. Firstly, the technological- and managerial complexity of the entity being built, secondly, differences in mutual expectations among internal and external parties, and thirdly, time and cost overruns in the project.

In the third dimension characteristics of the actors are addressed. The first of these is related to the parties' reluctance to make relational investments. Instability among the actors' representatives and change of key personnel are sometimes applied as escape-routes when conflict occurs. A third factor addresses the parties' willingness to apply relative power differences. The

fourth factor addresses ambiguous assignments held by the representatives. Finally, the individual representatives comprise a range of characteristics having effect on willingness and ability to develop and apply informal governance mechanisms.

The final dimension, the characteristics of the interaction process, addresses specifically the history of the interaction because willingness to built trust is strongly associated with past business experience.

Summing up, the study reveals that the "human factor" found in the informal governance mechanisms are of crucial importance when understanding why conflict occurs in complex projects. These findings are also supported by findings in the "non-project"-case. One major managerial implication of the findings is that the informal governance mechanisms, embracing the "human factor", should be carefully monitored and strengthened in relation to formal planning and routinization of complex activities.

Acknowledgements

The theoretical framework applied in this thesis claims that the firm is embedded in an industrial network, and is interdependent with surrounding actors. After three years dedicated with doctoral studies, I have a strong feeling that the same applies to me. Without my "non-industrial" network this thesis would end up in nothing.

Thank you, Peter J.Trønslin for supporting the research idea and your successful efforts to finance three years of research in a situation where cost cut was on the agenda in Statoil. I appreciate your supportive interest and willingness to share industrial insight during the research process.

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Terje I.Våland

Preface

This is a study of conflicts in complex projects. It is divided in four parts, the first part, (chapters 1-5) introduces context, the phenomenon, theory, methodology, and research questions. Part II (chapters 6-11) and part III part (chapters 12-14) includes design, analysis and findings for the two stages of the study. Then follows the concluding part IV (chapters 15-18).

Chapter 1 defines and briefly discusses complex projects. In the following chapter the phenomenon of conflict is outlined and related to the project context. In chapter 3 the complex project is discussed in relation to the industrial network approach which the complex project is a part of and interrelated with. My arguments for applying this theoretical framework in approaching the context of complex projects are also outlined. Phenomenon and context raises philosophical, methodological and theoretical questions, and these are discussed in chapter 4. In the last chapter of part one the research questions are raised, and organized in two stages. These are outlined in the following part two and three.

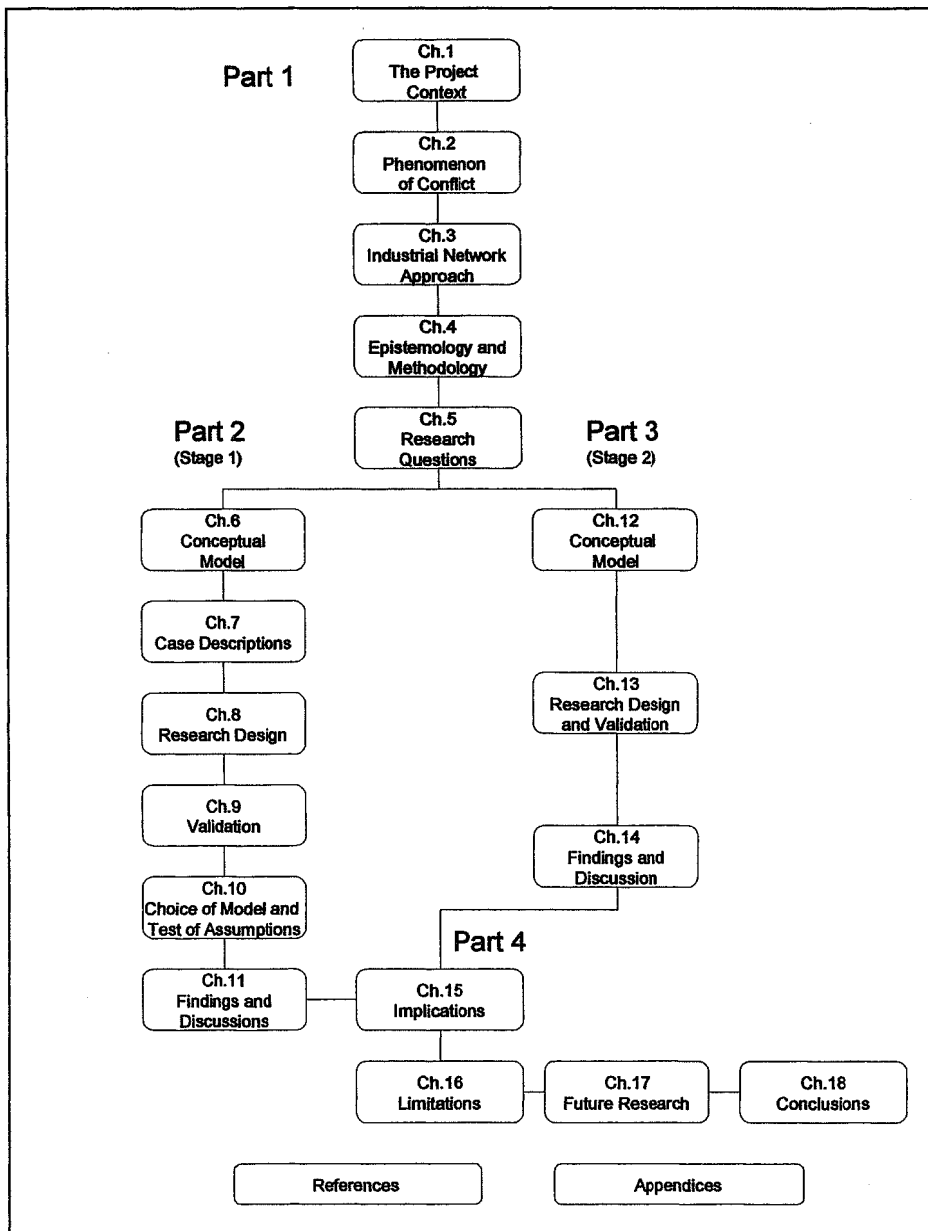
Part II contains stage one of the study, and is starts with conceptualization in chapter 6, and continue with a case description in chapter 7. Research design and a discussion of validation are set up in chapter 8 and 9. Since stage one of the study is based on a variable analysis, a discussion of statistical tools and assumptions are included in chapter 10. The final chapter in part II includes the analysis and empirical findings for the first stage of the study.

In part III the stage two of the study is included. It starts with conceptualization and research design in chapter 12, and continues with validity discussion and the empirical findings in chapter 13 and 14.

The final part starts with theoretical, methodological and managerial implications in chapter 15, continues with limitations and further research, and ends up with conclusions in chapter 18.

An overview of the chapters is illustrated in the following figure:

0.1 Overview of the chapters



Introduction to the study

Expected research contribution

Early morning on August 23rd 1991 the national earthquake center in Bergen recorded a quake that measured 3 on the Richter scale. However, this was not an earthquake in the normal sense, but the 250000 ton "Sleipner A GBS" concrete platform that hit the seabed of the Stavanger basin during completion tests. Miscalculation caused crackdown in vital structures in the concrete pillars, and the national oil industry of Norway feared its reputation in the international market would suffer. Future business was in danger. Even before the investigation of the accident was completed, a new copy of the Sleipner platform was launched after a remarkable smooth building process in a quite different business atmosphere between project owner and main contractor. The building process, characterized by strong cooperation and mutual trust between the actors involved, led to an earlier completion date, lower cost and lower level of conflict than expected. What happened to the business relations between the owner and the main contractor? A common fear of losing international reputation? Increased mutual dependency? Something happened to the business-to-business interaction after this accident.

In this study I want to find an answer to these questions and further investigate the business relations that exist between the oil companies controlling large fabrication projects and their main contractors. As in other parts of life, I believe that relationships are most interesting when put under stress and pressure, and probably easier to study as well. My study will therefore focus on conflicts in the interaction between buyer and seller in a project setting. In revealing and studying episodes of conflict in oil projects I aim to create new managerial knowledge to improve the competitive strength of oil companies and suppliers.

The rationale behind the study

The Sleipner case opened the eyes for a new way of understanding business interaction including elements such as mutuality, shared problems and beliefs. And in subsequent years a growing emphasis on developing sustainable business relations and mutual commitment beyond contractual obligations has emerged. New ways of organizing the interface between the buyer (the project) and the seller (contractor) has followed this new way of thinking. In this situation the need for new knowledge on conditions for

profitable and sound business relationship has been addressed. One way to do this is to focus on situations that stress the relationships, e.g. conflicts, and identify their characteristics. This is the main rationale for the study, which is generously expressed through financial support for the research.

The research problem

The research problem is to find the basic reasons why conflict emerges in business relationships. In order to do so specific episodes of conflict are extracted from real business relationships, and based on perceptions from the buyer's and the seller's side, related to two broad categories of governance mechanisms. The sources to conflict are thus expressed through the two sets of governance mechanisms. Through the first mechanism the human factor and informal interaction are important ingredients, whereas the second embraces procedures, contracts and with an emphasis on formal planning. This approach differs from contemporary studies of conflict in business relationships where the sources to conflict are mainly interpreted in terms of power differences between the parties.

The research context

Complex fabrication projects from the Norwegian oil industry are applied as research context. The projects are all owned and controlled by Statoil. Heavy interdependencies between actors involved in the fabrication process, reliance on mutual exploitation of resources and extremely complex activity structures are important characteristics of the context. In this type of context conflict is considered as a natural element in the "normal" business relationship. This opens for a new perspective in understanding why conflict emerges and the role of conflict in the business relationship.

Positioning in relation to other studies

Compared with past conflict studies, the empirical material is more complex with a blurred picture of the actors involved. The product is far more advanced and difficult to manage. Time constraints and a high technological level are new elements. The study thus follows an established research stream of dyadic conflict research in business-to-business interaction. I also study micro processes ("friction events") and apply these to draw conclusions on business relationship characteristics. This is not very

common in contemporary studies that tend to focus on a more aggregated level.

The study is also related to the European IMP research tradition embracing the industrial network approach (Håkansson and Snehota 1995). It is, however, not a pure network study with emphasis on a large number of interrelated actors. I rather focus on the dyadic relationship and discuss these in relation to active third parties and others in the network environment.

A third position is in relation to a managerial perspective, since to my knowledge no other study has specifically focused on conflicts in oil related fabrication projects.

PART 1 INTRODUCTION

1. The complex project as context of the phenomenon

The purpose of this introduction chapter is to define and characterize complex projects as the context for the study. Contextual understanding is important in relation to choice of theoretical framework and methodology, but also in relation to our understanding of the phenomenon of conflict. The last argument is stressed by Bonoma (1976) arguing for the importance of contextual characteristics in understanding conflict.

1.1 Characteristics

A project includes a wide range of quite different characteristics with respect to i.e capital intensity, technological challenges and overall complexity. This study will deal with capital intensive development projects with a high degree of innovation and industrial complexity. Both the buying and selling parties are interlocked into mutual dependencies with bounded knowledge. The study includes two projects from the Norwegian offshore oil industry. In addition one minor study of a non-project (e.g. operations within a stable organization), will be analyzed for comparison with the projects.

The project construct is characterized by three basic axioms (Hetland 1998). The first pertains to the task, the second to the actors involved, and the third to the goal orientation and bounded rationality. Firstly, the task is unique in the sense that the organization has to change temporarily to accomplish the task. The task is final in the sense of having limitations of time and extent. The task is multidisciplinary in the sense that extensive cross-functional and cross-organizational interaction are crucial. From the second axiom it follows that the project is intended to cease at a predetermined point of time when the task is accomplished, and that parts of the project task are carried out in the original base organization, thus creating coordination challenges. It also follows that the principal role and the agent role are present in the same virtual organization in the sense that buyer and seller are located in the same project. The third axiom states that the project processes are purpose orientated but limited by bounded rationality. This implies that some possible alternatives and consequences will always remain undisclosed. Two aspects of the axioms should be made clear. Firstly, a complex project should be related to the different axioms along a continuum. This implies varying degrees of uniqueness, recursion, extent of multi-disciplines

involved etc. Secondly, the axioms may be differently perceived from the perspectives of actors involved.

The complex project consists of several activity phases. The phases include a planning phase, including the sub phases of exploration, development planning, feasibility studies, conceptual studies, project organization and pre-engineering, an implementation phase, including the sub-phases of detail engineering, fabrication and construction, hook-up and commissioning, and finally production (Kolltveit and Reve 1998). In recent years the traditional sequential thinking and clear-cut division between the phases have been changed into a parallel and holistic thinking with less distinction between the phases. This leads up to a strong emphasis on interaction and acknowledgements of activity interdependence between the group of "architects and builders" and the "oil field operation" group. Ambitions for cost reductions and a shorter "time-to-market" from discovery of oil resources to sale, are the main rationale behind this change.

1.2 Institutional form

The project is an institutional form mixed with elements from market governance and the internal hierarchy, sometimes referred to as a hybrid. Hybrids are governance mechanisms between the market and the hierarchy (Williamson 1985). The project is thus a temporarily organizational entity set up for a specific purpose, which draws resources from a base organization. In other words it is an organizational arrangement that uses resources and/or governance structures from more than one existing organization (Borys and Jemison 1989). Ranging from a variety of organizational combinations and even non-organizations, its generic goal is to avoid the disadvantages of conventional (unitary) organizations. The rationale behind a complex project is to avoid a market that is, due to e.g. managerial or technological complexity, unable to deliver a *turn-key* subject in accordance with the buyers' needs. Secondly, the project is established to avoid the inertia and lack of dynamics of internal governance. Thirdly, the parties involved are both related in a joint entity as well as being sovereign organizations, thus raising a variety of critical issues with a risk of conflict.

1.3 Project definitions

From a definitional perspective there exists a number of suggestions. However, they seem to have some features in common, such as the existence of own goals, low frequency and predetermined time- and resource limitations. The core of the project can thus be described as a *one shot approach*, to scan, bid and negotiate (Cova and Salle 1992). The

acknowledgement of the project as a part of an innovation can also be added (Kolltveit and Reve 1998). Their definition of a project is "a task consisting of a distinctive goal, low frequency, predetermined time- and resource limitations, and as a part of an innovation process, usually connected to a financial transaction" (Kolltveit and Reve 1998:12). In this study the project is further characterized by being capital intensive and using advanced technologies, thus being "complex projects".

1.4 Implications for the study

The context represents at least three major challenges for the study. Firstly, there is a theoretical challenge in terms of the hybrid form of governance. It is neither governed by the market, nor the internal hierarchy. Secondly, the context is characterized by high degree of technological complexity consisting of a large number of interdependencies. This implies that the phenomenon occurring in e.g. activity structures hardly can be isolated for analysis without losing crucial parts of the picture. Finally, there is a managerial complexity with a large number of actors, including active third parties. This implies that the phenomenon easily will be interpreted in terms of an open system with more or less visible interfaces between the actors. Taken together these three challenges have impact on the parties' perception of the phenomenon and the way phenomenon is approached, and on my choice of theory.

2. The phenomenon of conflict

In this chapter I define conflict and describe its different characteristics in relation to the complex project context. Secondly, I will provide a critical view on previous conflict studies including contextual and methodological limitations. Thirdly, sources to conflict based on past studies is discussed and related to complex projects. Fourthly, I discuss a complementary way to the sources to conflict based on a study of governance mechanisms associated with conflict. This is also the main rationale for the study. Finally, I suggest a way to approach the informants by addressing "friction" instead of "conflict".

2.1 Defining conflict

Rex (1981) claims that the core issue of conflict is the situation in which A fully understands what is expected of him, but rejects the line of conduct that B requires. Furthermore A is prepared to pursue both his own goals and the line of action by which he proposes to achieve them. A shorter definition is suggested by Deutsch (1973): "A conflict exists whenever incompatible activities occur".

Pondy (1967) further adds three attributes in understanding inter-organizational conflict. Firstly, that each conflict relationship is made up of a sequence of interlocking conflict episodes, secondly, that conflict is intimately tied up with the stability of organization, and thirdly, that conflict may both be functional and dysfunctional. I concur that these initial statements about conflict constitute an adequate starting point.

2.2 Conflict as a sequence of episodes

Episodes of conflict can be thought of as a gradual escalation to a state of disorder consisting of five stages: Latent-, perceived-, felt-, manifest conflict, and conflict aftermath (Pondy 1967). I discuss each of these as a first step and then discuss them in relation to my type of complex project.

The latent conflict:

The conditions or underlying sources of conflict are found here. The latent conflict can be based upon (1) competition for scarce resources, illustrated by the project team competing for unanticipated docking capacity interfering

with other ongoing projects. (2) It can be based upon drives for autonomy where the project team seeks to insulate itself from being controlled by the base organization. Finally (3) a divergence of goals can emerge through manpower rotation between supplier and the project team.

The perceived conflict

This conflict may, or may not, stem from a latent conflict. If not, the conflict results from misunderstanding of each other's true position. By involving suppliers in the project core team and interorganizational rotation of manpower one seeks to improve communications. Sometimes a suppression mechanism blocks latent conflict from developing. This is illustrated through a project having more simultaneous episodes of conflict than they are able to handle. It therefore tries to reduce the number. The majority of contracts in the oil industry even have contractual provisions forcing the parties to temporarily suppress conflict to safeguard project progress.

The felt conflict

This is characterized by the personalization of conflict, which sometimes occurs in business to business relations. Managers may be representatives for large organizations involved in contractual battles challenging the value of their companies. This may cause a tremendous pressure on the individuals, which increases the risk of personalizing the conflict fueled by mass media. Project stories are full of high profile individuals being accused of enhancing conflict.

The manifest conflict

The most useful definition seems to be that behavior, in the mind of the actor frustrates the goals of at least some of the other participants (Pondy 1967). Various administrative and legal resolution processes are applied here. In a complex project the manifested conflict may follow a path towards negotiations, voluntary mediation with third party assistance, arbitration tribunal, or it may finally end up as a court decision. Conflict in complex projects is well represented in all those stages of conflict escalation.

Conflict aftermath

Development of each conflict episode is determined by a complex combination of the effects of preceding episodes and the environment (Pondy 1967). This implies that a conflict between one project and a specific supplier may have an effect later in the same project, or in succeeding projects. To what extent conflict experience in one project dyad is carried on into other project dyads is to a large extent dependent upon the extent of organizational learning.

Some conflicts reach a satisfactory solution without escalating into a manifest conflict. However, any conflict is assumed to have the ingredients for developing into a negative pattern. The key aspect is to relate different conflict episodes to each other. The starting point can be a co-operative atmosphere between the two counterparts – for example, the owner of the project (buyer) and the yard (seller). Several years of business exchange and expectation for the future are manifested in a sound business relation. Then there is some sporadic and unplanned variation deviating from planned and repetitive aspects. At the yard the project site team (buyer) discloses faulty welding seams caused by a sub-contractor, an unexpected event which triggers some actions. As a next step the buyer demands the yard to carry out comprehensive extra tests of all welding seams. However, the required tests are denied. Combined with a number of other events that have accumulated in the interaction between the parties, a temporary breach of the business relation later emerges. The initial conflict triggered a domino effect, which transformed the relationship between the two parties into a legal dispute.

This further illustrates that any conflict is strongly contextually connected, and therefore difficult to assess in isolation. Some caution should therefore be executed in performing the analysis of conflict, without being aware of the danger of isolating episodes of conflict from the context.

A conflict may consist of actions such as e.g. the first observation of one faulty welding seam by one sub-contractor. This is one element in an episode in which all the sub-contractor's welding seams were found faulty. This in turn is a part of a sequence where the yard and the project team develop into a managerial dispute in the specific project. This represents yet another ingredient in the business relationship between the yard and the project owners (the oil field licensees) which is characterized by breach of contract claims. This can be further recognized in the industrial network in which the yard and the buyer are embedded and where their positions are interdependent with a variety of other actors. From this follows that a single action occurring in a project dyad is always embedded into something larger – it is a part of an industrial network. Hence any partial assessment of conflict has to be constrained. On the other hand all larger pictures are built up by smaller events. Thus, I have to work both with events and with larger entities.

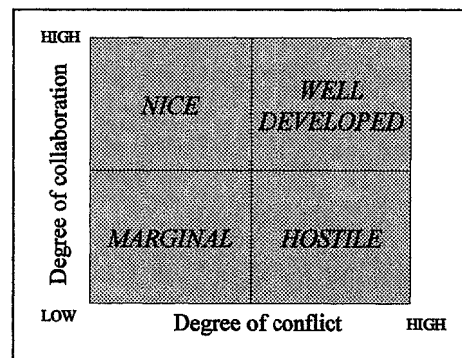
Summing up, I argue that the phenomenon of conflict in a complex project should firstly, be interpreted as a sequential- and an interrelated phenomenon, secondly as webbed into a larger whole.

2.3 Conflict as a dysfunctional and a functional phenomenon

The phenomenon of conflict is considered along two different perspectives. The first perspective regards a conflict as a disease in the business exchange with primarily disruptive, dissociating and dysfunctional consequences (Coser 1956). The aim is to avoid conflict or reduce its consequences, because of fear that too little coherence can develop into destructive conflict and a diffusion of focus. In projects this is achieved through detailed contracts and a high degree of specification. Price mechanisms and institutionalized patterns of behavior are used as instruments to reduce emergence and growth of conflict. In recent years new relational based contractual forms have supplied formal mechanisms by including social interaction elements and relational norms (Heide and John 1992 and Macneil 1980). The main point is, however, that conflict should be avoided, as it is a result of a structural mismatch that could and should have been anticipated.

The second perspective holds a more ambiguous view in assessing the cost/benefit of interorganizational conflict. Conflict may in fact be functional as well as dysfunctional (Pondy 1967). According to Gadde and Håkansson (1993) this can be illustrated along two axes, the first indicating the degree of collaboration between the buying and selling party, and the second indicating the degree of conflict in connection with business relationships.

Figure 2.1 Degree of conflict versus degree of collaboration



Source: Gadde and Håkansson (1993)

By viewing collaboration and conflict as two dimensions it is possible to identify four combinations. The most interesting is the fourth quadrant characterized by a high degree of conflict and at the same time a high degree of collaboration. Studies of industrial business relationships indicate that this

situation is typical for “well-developed” buyer-seller relationships (Gadde and Håkansson 1993), thus being an indication of an efficient process.

In a complex project the degree of cooperation between the buying and selling parties is extremely important for several reasons. Firstly, because of the technological complexity, secondly because of the strong activity interdependencies, thirdly because of the large number of internal and external third parties directly or indirectly involved, and finally because of time pressure. The importance of cooperation has during recent years led to the introduction of new strategic and managerial concepts (e.g. integrated project teams) aimed at enhancing cooperation.

There is a rationale for minimizing conflict and establishing balance and harmony in both activity- and resource structure. This is because a reduction in conflict can reduce overhead- and production costs for the project actors as well as speeding up the project progress. On the other hand, there is also a rationale for accepting conflict as an interactive tool for improvement and innovation.

A long range of events in the empirical material indicates that conflict in the short range increases project costs and slows down project progress. Endless number of conflict events, of which a few examples are on the following list, emphasize the negative aspect of conflict:

Table 2.1 Example of conflict in a complex project

Category	Key issues / Examples of conflict events
1. Organization of work	<ul style="list-style-type: none"> • Late startup of certain activities caused problems for succeeding activities. • The information flow was delayed when claimed problems were relayed to responsible unit. • Interfaces between disciplines and between the actors involved were unclear.
2. Data precision	<ul style="list-style-type: none"> • Drawings made for one purpose were not adjusted and sharpened for related purposes. • Activities were performed without updating information systems.
3. Work performance	<ul style="list-style-type: none"> • Design and construction errors caused effects in terms of oversized anchors, malfunction in interface between modules and systems, and collisions between cable gates and pipes. • Operational errors included requirements for rework due to lack of compliance with procedures and good practices.
4. Human interaction	<ul style="list-style-type: none"> • Weak communication between disciplines, such as between engineering and production. • Cultural and linguistic differences imposed stress on the buildup of business relations. • Buyer wanted to communicate directly with sub-suppliers but was hindered by formal obstacles or willingness to circumvent.
5. Physical resources	<ul style="list-style-type: none"> • Lack of physical capacity within areas such as materials- and welding. • Tools for inter-discipline check such as cable routing software were missing • Incompatibility between data systems caused data duplication.
6. Manpower resources	<ul style="list-style-type: none"> • Lack of skills to understand and/or carry out aspects of the task. • Capacity was sometimes too low with too few people allocated to the task. • Managers did not possess sufficient decision making power in order to solve the problems

By applying a more process oriented view the picture becomes more blurred. Several scholars within industrial network approach (i.e Gadde and Håkansson (1993), Gemünden (1985)) and conflict theory (i.e Pascale (1990), Deutsch (1973), and Pondy (1967)) argue that development, and creativity, are stimulated by imbalance and problems. This is backed by the old Japanese saying; "The moment two bubbles are united, they both vanish" (Pascale 1990).

For a project this has at least two interesting implications. Firstly the fact that a complex project has an important technological content. Conflicts can enhance creativity and innovations in this content. Secondly, that the success of a project partly depends upon its base organization, which is the starting point of any project. Creativity and innovations outside the frame of the

focal project is therefore an important ingredient in establishing the fundament for future projects, not least with respect to development of new marginal oil fields requiring heavy technology development.

The value of conflict can be further illustrated by means of the Norne-project, which is one of the cases in the current study. This project was a successful result of a technological- and a managerial conflict leading up to a new type of offshore production facility, and a new managerial concept aimed at reducing buyer-seller interface problems. The technological conflict stemmed from a mismatch between a marginally profitable North Sea oil- and gas resource and current technology offered by the concept/fabrication-suppliers. A commercial exploration of the field depended upon new concepts being found. The traditional oil platform was replaced by a production vessel. A new offshore technology emerged, capable of exploring marginal oil fields.

The managerial innovation stemmed from a conflict between buyer-seller autonomy, and interface complexity fueled by costly and comprehensive procedures and lack of project progress. A new structural- and process concept was then introduced, which challenged the traditional organizational forms of the supplier industry. The outcome was an integrated core team consisting of buyer and seller in one project organization with larger autonomy to their base-organizations than before. The concept was a success and was employed in subsequent projects.

Summing up, I conclude that in a complex project, including its base-organization, conflict and cooperation co-exist. Although organizational stability is desirable to obtain smooth daily operations, stability should be disturbed by activities, which create openings to identify new combinations or resources and/or activities.

The most gifted members of the human species are at their creative best when they cannot have their way. Creativity and adaptation are born of tension, passion, and conflict"

(Pascale 1990).

2.4 The social dimension of conflict

From a sociological point of view, conflict is a social phenomenon. Neither the occurrence nor the outcome of the conflict is completely and rigidly

determined by the objective circumstances (Deutsch 1973). On the other hand, the importance of "real" conflict cannot be denied.

Two processes can be related to the phenomenon of conflict. The first process deals with the coupling between the "real" situation (Deutsch 1973) and the conflict as such. The second process deals with the coupling between the conflict and solution. I will leave the second issue until the next section and concentrate on the first one here.

The "real" situation initiating the conflict, can for example be a technical interface problem. The process, caused by the situation, can develop either into a conflict or an action providing a direct solution. In many instances a situation leading to a solution is favorable. Other situations lead to conflicts that can be more or less unnecessary. The crucial question is what kind of forces drives the process into a constructive pattern, and what doesn't.

Applying a social interaction approach the process from the situation to the conflict is interpreted in terms of how the situation is regarded in relation to the actor's perceptions of history and expectations. This implies that the actor's perceptions are a crucial point in addressing the situation as a conflict. This further implies that whereas some actors may define the situation as a challenge and a potential for strengthening the relationship, others may perceive this as an expression of lack of mutual goal orientation and distrust. This can be illustrated through a situation where the project site team (buyer) discloses faulty welding seams at the yard (seller). The situation where a company is building an offshore production vessel for the first time may be interpreted as an opportunity to initiate improvement in welding procedures and quality assurance and further enhance future business relations. However, it can also be seen as one event in a chain of incidents indicating incompetence and/or dishonesty.

Different perceptions of a conflict can also stem from other actors than the buyer or seller in a dyadic relation. The relation between the project team and base-organization on both the buyer- and seller sides respectively have interesting implications for perceiving conflict. The project team is organized as a unit designed for the accomplishment of a specific task. Their point of origin is the base organization from which the majority of manpower and physical resources such as technical and managerial support systems are drawn. After project completion the resources are reversed and deployed for other use. This organization can in one way be described as an independent business unit operating with a minimum of direct involvement from the base organization, and a high degree of managerial freedom. On the other hand organizational or hierarchical mechanisms may be applied by the

base organizations in situations where project goals interfere with e.g. company strategy. The base organization may also consist of a variety of sub-units with more or less goal harmony. The legal department and the department of contracts and industrial relations may for example have different opinions regarding incentives that they may impose on the project team. They may accordingly be characterized as *internal third parties* to the focal project, representing the *base organization's decision level* imposing both opportunities and constraints on the *project decision level*. It is thus hard to argue that conflict occurring between the projects' buyer side and sellers' side of the same can be fully understood regardless of the role of the parties' base organizations.

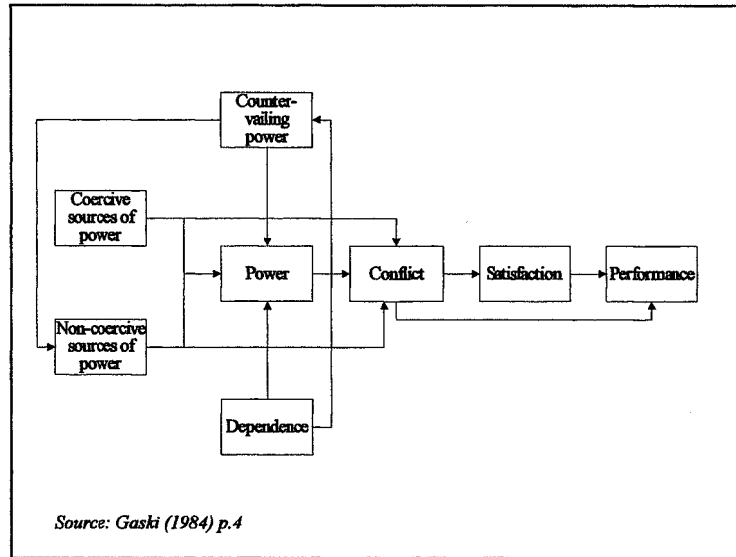
To sum up, I have argued that two processes can be related to the phenomenon of conflict. The first process deals with the coupling between the more or less objective "real" situation and the conflict as such. The second process deals with the coupling between the conflict and solution. Applying a social interaction approach the process from the situation to the conflict is interpreted in terms of the actor's perceptions of history and expectations. Different perceptions of a conflict can also stem from other actors than the buyer or seller in a dyadic relation.

2.5 Past studies of conflict

2.5.1 Overview

A review article made by Gaski (1984) discusses the findings in 18 empirical studies of conflict in channels of distribution. They are all based upon the power construct claiming a connection between power and conflict as illustrated in the following figure:

Figure 2.2 Power, dependencies and conflict



Power as both a dependent and independent variable in relation to conflict seems to be commonly acknowledged. The causal sequence thus proceeds in either direction. "Based upon the reported findings, it appears that the nature and sources of the power possessed by a channel entity may affect the presence and level of conflict" (Gaski 1984). Empirical work within marketing, however, assumes power to have a causative factor to conflict. This has led to a focus on relations between coercive sources- and non-coercive sources of power and conflict, conflict and satisfaction and conflict and performance.

2.5.2 Limitations in existing studies

Contextual limitations

Using Gaski (1984) as point of reference, thus accepting power as one construct in explaining conflict, the context of the 18 empirical studies may have certain limitations in understanding complex projects. Three limitations are of particular interest. The first has to do with the product and services applied in the research. Product and services included in the studies have a rather straightforward definition and perception of quality aspects. Furthermore the product and services do not seem to possess important innovative attributes. It is hard to see how mass-produced cars, beer, household insurance or fast food per se can cause any severe conflict between the parties because relatively small investments, combined with

alternative actors limit the risk and consequences of failure. The product and services applied seem to lack some of the complexity for it to have an active role as facilitator to conflict. A remaining few of the 18 studies do not address the type of goods and services quite clearly, but leave no traces of complex products and services. Compared to a complex project they do not possess clear idiosyncratic, capital-intensive, nor innovative elements challenging the interface between buying and selling parties.

The second limitation relates to the parties involved. The roles of the actors included in the focal dyads are fairly straightforward, and easy to define. Manufacturer versus distributor, franchiser versus franchisee and supplier versus manufacturer do not represent severe challenges in fundamental role patterns. Although a franchiser-franchisee dyad and a supplier-manufacturer may involve elements of innovation, the extent of innovation and investment idiosyncraticities is not paramount. With a relatively low extent of innovation there is always a new actor waiting to step in, thus reducing the risk of conflict breaking out. Thus the parties involved in the dyadic studies do not seem to cause conflict as a result of role perceptual challenges. To put it another way: Conflict between those individual parties does not seem to jeopardize future existence.

The third limitation refers to the lack of third parties in the studies. A focus on dyadic relation is fruitful when a phenomenon is limited to two parties, but is a constraint when other parties play a role as facilitator for the conflict. In capital intensive innovation projects, where the roles of buyers and sellers are ambiguous and further involve several interdependent third parties, the picture becomes blurred. In such a situation a third party may easily enter the scene to play a role.

Summing up, the product and services being studied are rather easy to grasp and are possibly no main contributors to the boost of conflict between the buying and selling parties. The roles of the interacting parties are fairly clear, stable and easily defined, and the unit of analysis is restricted to dyadic relations.

Epistemological limitations

In order to understand the phenomenon of conflict it is necessary to ground the scientific approach on a set of basic assumptions. Through epistemology, the foundation for this is examined in terms of the nature of knowledge and how it works. The phenomenon can be approached from three different philosophical angles: A subjectivistic, objectivistic, and a hermeneutic angle. If I apply a subjectivistic approach, I run the risk of losing the realistic world-view, thus opening for law-like generalizations. From an objectivistic

angle of attack I risk losing the subjective worldview and the assumptions of the voluntary human nature. From a hermeneutic angle of attack, I run the risk of interpreting the phenomenon out of its point of origin and jeopardizing scientific validation efforts. Any angle of attack thus provides both a shadow as well as an opportunity to shed light on the phenomena. In a critical assessment of past empirical findings it is therefore highly relevant to touch the epistemological angle of attack.

The 18 empirical studies hold an objectivistic orientation, which implies strengths and weaknesses. Strengths in the way validation issues are dealt with and compliance with a classic research tradition within studies of economic exchange. Weaknesses in the way behavior, learning and motives among informants are recognized. Language is an important tool in investigating social phenomena, recognizing that the researcher cannot be isolated from language. In an objectivistic approach the research ideal is to keep a clear distinction between the researcher and the object being studied, thus running the risk of not grasping the depth of the phenomenon expressed through an ambiguous language. Does only one conflict reality exist, expressed by one unanimous language?

The majority of the 18 empirical studies are descriptive studies carried out quantitatively. They are basically of an "in-context" type implying that primary information sources are applied. The majority of studies (13) apply communicative methodologies including sample surveys. A few also combine mail questionnaires and interviews. One crucial challenge at firm level is who the person (-s) actually answering the questions is (are). Who is offered the opportunity to answer the 75-question questionnaire, the managing director or the novice? Another crucial issue is the key informant validity problems addressed by (John and Reve 1982). The risk is that a structured survey will only touch the surface of the phenomenon given the sensitive character of conflict in ongoing business relations. Semi structured or unstructured surveys will rather provide the flexibility needed to grasp the opportunities offered by worried managerial key informants, or even better: What is hidden in internal written material? The studies are generally carried out in a contemporary setting, and I thus miss the longitudinal setting opening for the possibilities that perceptions of power and conflict may change over time.

This boils down to one crucial question: How do the selected methodologies serve the sensitive character of conflict in ongoing business relations with regards to the validity of key informants?

2.5.3 How to fill the "gap"?

There are at least three complementary ways of adding further knowledge. First, Gaski (1984) addresses the need for measures from alternate positions, and studies of behavioral consequences of perceptual disparities. A study where key informants from both buyer- and seller positions, and even third parties, are included would be fruitful. The behavioral sides may further require a deviation from an objectivistic position.

Secondly, contextual limitations can be solved by a study of complex projects where the roles of the actors are ambiguous. Furthermore technological and organizational interdependencies between the parties involved would reveal a realistic complexity. An extension of the unit of analysis from a dyad to a network (triad or polyad) will further add complexity, and sources to conflict. The context could be a fabrication project within the oil industry characterized by innovation, technological and managerial complexity, and heavy idiosyncratic investments with uncertain profitability. Selecting a fundamental different context is in accordance with Bonoma (1976), who stresses the importance of understanding conflict through the contextual characteristics. He concludes that, "definitions of the specific theoretical explanators of social behavior in various interaction systems adopt different forms because of context differentials" (Bonoma 1976).

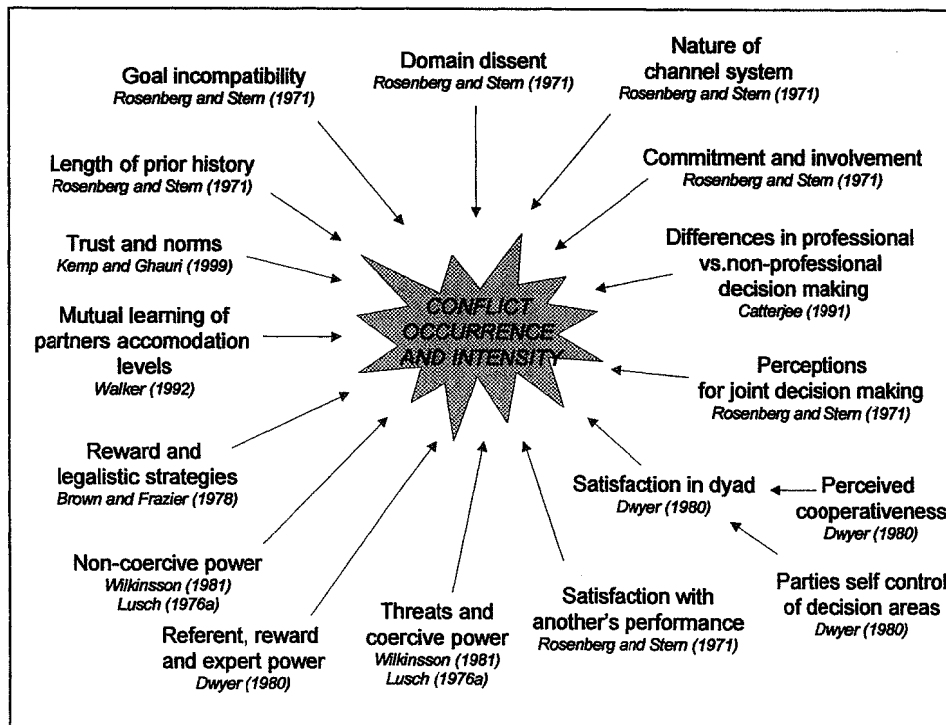
Thirdly, the methodological limitations could be challenged through a qualitative (or perhaps in combination with a quantitative), exploratory study. Flexibility is one strength in an exploratory study. By having complex social phenomena such as conflict with new pieces of information emerging in the research process, methodological flexibility is encouraged. This methodology is fruitful in order to gain insights and ideas, and accordingly helpful in breaking broad, vague problem statements down into smaller, more precise sub problem statements, hopefully in the form of specific hypotheses (Churchill 1987). Finally event-based case study will provide insight into episodes of conflict which may be easy to identify and analyze thoroughly.

Summing up, findings in previous studies need to be supplemented by a more complex empirical base and a more refined methodology reflecting the complexity of projects.

2.6 Sources to conflict based on the power construct

Studies of interorganizational conflict reveal a variety of aspects of the phenomenon. Two aspects are of particular interest. Firstly, what are the main sources of conflict occurrence and intensity in a marketing channel? Secondly, how do third parties play a role? The following figure illustrates some of the empirical findings related to conflict occurrence and intensity.

Figure 2.3 Past studies of conflict occurrence and intensity



In the following the relevance of the findings for understanding complex projects will be discussed. This discussion is important, not least because none of the studies are based on empirical findings from hybrids.

The importance of the nature of channel system

On a macro level certain issues in a dyad generate more conflict than others (Rosenberg and Stern 1971). Within a complex project context there are different macro variables which characterize points of origin of conflict. One

macro variable is the degree of market instability with respect to supply and demand for capacity. Supply/demand in oil related projects are subject to fluctuations in oil prices, discovery of profitable oil reservoirs and the number of production licenses granted by the government. Other projects, such as airports and public infrastructure projects, are characterized by other conflict variables, e.g. political- and socioeconomic considerations. Hence the nature of the channel system suggested by Rosenberg and Stern (1971) is of interest.

Domain dissent

One area of disagreement causing conflict is related to the distribution of tasks and responsibilities between the parties (Rosenberg and Stern 1971). A lack of understanding about the domain of the parties may in turn lead to a lack of understanding of the purpose of the hybrid (Borys and Jemison 1989). On the other hand, the purpose of combining resources from the parties may create a new domain. The challenge in creating proper division lines (with increased risk of increasing conflict level) is further enhanced with increasing activity- and resource interdependencies. This is further enhanced through technological innovation carried out in close cooperation between project and supplier. Who owns and controls the innovation? Who has the right to change crucial activity patterns and standards, the focal project management or the seller of a large system delivery package? In complex projects the roles of buyer and seller might be far more ambiguous than the parties marketing household durable goods upon which Rosenberg and Stern (1971) study is based. The problem of division lines between parties is addressed by Stinchcombe and Heimer (1985) who claim the importance of the "decoupling principle". This principle states that "if two activities are highly interdependent, they should be carried out by the same organization, under the same authority" (Stinchcombe and Heimer 1985). The problem is, however, that this principle is often violated through the split-up of interdependent activities, thus causing interface problems, and uncertainties as to who is to decide domain.

Domain problems can also be addressed in a wider perspective, as a hybrid. ".harmony and conflict resolution are difficult to achieve because partners often do not share a common environment or domain and, thus, lack a foundation for generating a set of common understanding about the purpose of the hybrid and the process by which that purpose can be achieved" (Borys and Jemison 1989).

Goal incompatibility, commitment and involvement

Goal incompatibility, commitment and involvement are three factors explaining sources of conflict (Rosenberg and Stern 1971). Can a project

include important actors with contradictory goals? In economic exchange both parties interact in order to make money. This is encouraged by the establishment of economic incentives in order to secure project progress. These incentives can play an important role in a complex project. Willingness and ability to cooperate, commitment and involvement are thus connected to a financial win-win situation for both parties. One might thus argue that the risk of having contradictory goals is less explicit because the consequences of having those goals are punished in terms of losing bonus. On the other hand, not all projects are supported by incentives supporting common goal orientation, commitment and involvement. And if the incentives do exist, a great number of partial decision makers have to be able to connect single decisions to the totality, and envisage its consequences in order to have an effect. Normally these three elements are hardly a predominant element in explaining project-supplier conflict unless there is absence or existence of a faulty incentive system.

Commitment by both parties is another critical issue. Lack of expectations of future transactions, due to e.g. competitive bidding, leads to reliance on formal and hierarchic mechanisms such as contracts. Contracts are, however, difficult to specify under conditions of uncertainty and where partner obligations are designed to change over time (Borys and Jemison 1989) and in environments and situations of high complexity (Stinchcombe and Heimer 1985). The actors can thus enter a vacuum where they are unable to bridge the gap between the requirement for commitment and the inadequacy of formal governance mechanisms.

Decision making

Rosenberg and Stern (1971) suggest that parties with different perceptions on how to make decisions in the dyad can cause conflict. Joint decision making is crucial in a complex project context for at least two reasons. Firstly, activity structure and links between activities cannot be altered without interfering with other activities performed by other actors. Secondly, a great number of such decisions require mutual perceptions. Hence one can easily argue that different perceptions on how to deal with interdependent activities may increase the risk of conflict, as suggested by Rosenberg and Stern (1971).

The sensitivity of this issue is also illustrated through the problem of violating "matching hierarchies" addressed by Dahlgren and Söderlund (1999). An expert group from the supplier (on low hierarchic level) addresses problems or solutions directly to the project core team manager (on high hierarchic level), or a dissatisfied (buying) project manager bypasses the adjacent supplier project manager and goes directly to top

management in a large supplier organization. Unclear perceptions of decision patterns may thus create conflict.

A second issue is raised by Borys and Jemison (1989) who address a generic problem among hybrids: The lack of reciprocal understanding of the other's operations, and subsequent resistance from unexpected sources. This understanding is crucial in a project characterized by interdependent resources and activities, but at the same time a source of managerial conflict.

One case study by Chatterjee (1991) of a non-profit organization suggests that interaction between professional groups and non-professional groups are a source to conflict. A complex project is multidiscipline in the sense that extensive crossfunctional and cross-organizational interaction is crucial (Hetland 1998). This implies that different professional groups interact with managerial and support staff with weaker professional ties. According to Chatterjee (1991), professional staff in project core teams interacting with supplier managerial staff may create structural conflict.

Prior history, trust, norms and mutual learning

Rosenberg and Stern (1971) claim there is a relationship between the interaction history and conflict, based upon the assumption that mutual experience reduces the risk of sanctions of bringing up conflict. Hence the barriers to conflict are lower in long term relationships. On the other hand Walker (1972) claims that mutual learning reduces conflict, because the parties are better bargainers knowing the others sides priorities and accommodation levels. The last complies with findings made by Kemp and Ghauri (1999) suggesting that trust and norms, which are a result of long term development, reduce the potential for conflict. A complex project is a time limited organization, or a discontinuing value chain. This implies that the history between buyer and seller may be short, with limitations for developing norms and trust. Whereas conventional organizations achieve stability through rules, procedures, and roles that create expectations of stability and dependability, hybrids often cannot capitalize on authority and trust because their members lack a common history (Borys and Jemison 1989). This can be illustrated through bidders competing for a limited number of contracts where some lose, others win. How can trust, and mutual learning be developed if the time perspective for the interaction is limited to one, two or three years? One can therefore argue that the real potential of future transactions is tied up to cooperation (Axelrod 1984). Future transaction is based upon winning uncertain future contracts.

On the other hand, a recent study of interorganizational learning in project claims the very existence of mutual learning between the buying and selling

parties (Hustad 1996). Why do the parties invest in mutual learning if the focal project is only a "one night stand"? Only further investigation of complex projects may reveal the relevance of prior history, trust, norms and mutual learning as possible ingredients in understanding conflict. Another argument supporting this view is that even if the projects per se are limited in time, the industrial actors can have a long history of business relationship (Håkansson and Snehota 1995), hence having the stability necessary for trust and stability to grow. Nevertheless this area possesses a wide range of interesting areas of conflict.

Reward and legalistic strategies

Brown and Frazier's (1978) study of manufacturing vs. dealer relationships suggests reward and legalistic strategies as causes of conflict. Reward may be expected, but not awarded, and legal action might be executed in areas where the other party expects "softer" decision patterns. It is not difficult to imagine that choice of reward and legalistic strategies may be one element in understanding project-supplier conflict. The parties may have strong relational expectations in the first phases of a project, which turn into legal battles focussing on the formal contract in later stages. A supplier may for instance share technical proprietary information with the project team or project base organization as a relational investment. In the next turn the project team uses the same information freely in other project-supplier dyads claiming contractual rights to do so. Choices of reward and legalistic strategies are accordingly a relevant element for project conflict understanding.

Power, coercive and non-coercive

Empirical findings by Lusch (1976a), Wilkinson (1981), and Dwyer (1980) suggest a connection between the use of non-coercive/coercive power and conflict. It is assumed that non-coercive power enhances the willingness to cooperate and reduces conflict (Wilkinson 1981). In this respect the mobilization of reward-, referent-, and expert power is regarded important (Dwyer (1980)). An influence strategy based on coercive power, however, is assumed to have the opposite effect. It is hard to argue against these findings in a complex project context. There are at least two good reasons for this:

Firstly, activity structures, resource structures and actor structures are complex and characterized by interdependencies. This requires a high degree of smoothness, flexibility, and adaptability among the actors involved. Use of threats and coercive power weakens this possibility, thus increasing the risk of jeopardizing project progress and causing conflict. Secondly, contracts are based on bounded knowledge which leads up to imperfect and incomplete contracts (Macaulay 1963). With high innovation involved in the

interaction, the scope of work might not even be clear prior to contractual award. Use of coercive power in terms of e.g. legal sanctions from one part, will probably cause the same reaction from the opposite side because of contractual ambiguity. Thirdly, the use of non-coercive power, e.g. reward-, referent-, and expert power, can stimulate cooperativeness simply because the number of buyers and sellers are limited (compared to those serving the consumer market). Furthermore the use of incentives in terms of collective bonuses are used for rewarding cooperative suppliers. These bonuses are often a major part of the supplier's profit. A supplier causing conflict will therefore, both as an individual company as well as a part of a collective group, run the risk of losing profit. The power issue also involves the question of how much of each partner's resources can be legitimately claimed by the project and to what extent each partner's governance structure has legitimate power over the hybrid (Borys and Jemison 1989). A certain resource controlled by one party might not be made available for the focal project due to allocation to other projects, or certain critical resources may be transferred to other projects too early at the sacrifice of the other party. Empirical evidence of power as a tool to claim resources from cooperating parties is not rare.

Perceived satisfaction with the other part

The parties' satisfaction in dyads is a result of their self-control of the decision areas and perceived cooperativeness in the channel (Dwyer 1980). Satisfied partners are assumed to reduce conflict. Actors in a complex project are in a varying degree interdependent, which further implies that both parties do have power. The supplier may reduce the project progress through maneuvers beyond his contractual obligations, and the project team/project owner(s) has/have the power to exclude the supplier for future business. In this perspective both parties have self-control of the decision areas. There is therefore a reason to believe that an approximate balance of power (and self-control) increases cooperativeness and reduces the conflict in accordance with the findings of Dwyer (1980). In an innovation-intensive project, with a high degree of interdependencies between the parties, one can thus argue that the level of conflict is low due to the parties' self control and satisfaction.

Further research of hybrids, in terms of complex projects, might reveal much of the same causes of conflict as indicated in the discussion above. Nevertheless the fundamental characteristics of the hybrid are different from the conventional unitary organization. Therefore the importance of the different causes of conflict suggested by those studies might be different. This is to some extent suggested by the stream of industrial network research, including the importance of third parties.

To sum up, I have discussed findings in studies of interorganizational conflict and acknowledged their relevance to complex projects. These are mainly based on the power construct. In the following I propose a complementary construct, labeled formal and informal governance mechanisms, which will form the basis for my investigation of the sources to conflict.

2.7 Sources to conflict based on the governance mechanism-construct

The governance mechanism-construct is applied for several purposes within interorganizational phenomena. One area is related to ways of organizing transactions most efficiently on an institutional level. Three governance mechanisms are applied: market-, hybrid-, or hierarchical governance (e.g. Williamson 1985,1996). The construct can also be applied in a discussion of how to manage existing business relations within any institutional form. The importance and combinations of incentives, authority and trust as governance mechanisms are among the most relevant governance mechanisms (e.g. Williamson 1996, Haugland 1996) in this context. In this study I apply the governance mechanism construct in terms of understanding the business relations in a project.

2.7.1 Defining governance mechanism

According to Williamson (1996:11) "governance is,.....an exercise in assessing the efficacy of alternative modes (means) of organization. The object is to effect good order through the mechanisms of governance". One can ask whether "good order" is a main goal for business relationship. "Good order" can reduce disturbance and improve efficiency, but can on the other hand prevent the functional side of conflict (see chapter 2.3) and reduce innovation. Hence I argue that the purpose of a governance mechanisms should be extended to include "value creation" to grasp the crucial importance of functional disturbance. Based on this I suggest the following: Governance mechanisms are institutional tools, values and ideals applied to effect good order and value creation in a business relationship.

2.7.2 Suggesting two main types of governance mechanisms

One option is to relate events of conflict to incentives, authority or trust. In a complex project it might, however, be difficult to fully distinguish between incentives and authority, since both are subject to predetermined written patterns of behavior between the parties. Incentives are used in combination with contract as a tool to motivate mutual goal achievement and limit the number and intensity of interorganizational conflict. The authority mechanism is applied both within the company boundaries and between organizations to centralize and formalize decisions in order to reduce the emergence and consequences of conflict. These can be concretized in terms of contractual articles, detailed drawings, procedures or routines. The third governance mechanism, trust, is quite different in terms of formalization and basically embraces important elements of the industrial network approach. Trust mechanism embraces personal connections, shared values and norms that develop mutual understanding and relational identity. Norms referred to as solidarity, mutuality, flexibility and conflict resolution (Macneil 1980) added to personal relations are the main ingredients in building trust (Haugland 1996).

For the further study I embrace both authority and incentive mechanisms into a construct labeled "formal governance mechanism". The trust based mechanism I label "informal governance mechanism". There are at least two important reasons why governance mechanism characteristics can shed light on the phenomenon of conflict. First, because they tell us about the point of origin of the conflict. If conflict in a specific dyad is primarily associated with a one of the two governance mechanisms, I can assume that weaknesses in this type of governance mechanism are the main sources for the emergence of conflict. In order to reduce the frequency and/or intensity of conflict the mechanisms should be strengthened.

2.7.3 Formal governance mechanisms and conflict

An event of conflict associated with strong formal mechanisms can stem from lack of contractual details, unclear formal procedures or unawareness of predefined patterns of behavior. The complexity in the atmosphere and environment is e.g. not fully reflected in the formal arrangements made prior to project start-up. Conflict events that are primarily connected to formal mechanisms are likely to be perceived as problems that should be avoided. They reflect planning deficiency, which in the next turn should be enhanced through even more detailed routines and contracts, -or perhaps the number of lawyers involved. All these problems can be seen as examples of a structural

misfit and the conflict is a result of this misfit. It could have been avoided through better planning. The formal mechanisms reflect a traditional view where prescriptive- and predefined patterns of behavior are assumed to reduce conflict. In other words conflict is a problem which should be avoided through formal arrangements.

2.7.4 Informal governance mechanisms and conflict

Informal mechanisms are related to the social dimension. It can indicate a lack of social and cultural awareness caused by for example lack of prior experience and trust, but it can also indicate that new opportunities of combining resources- and/or activities have been found, as addressed in chapter 3. Conflict events associated with informal mechanisms are likely to be solved by improving social interaction and the parties' mutual understanding of each other's. This further opens for more flexibility and exploration of new opportunities. Through the informal mechanisms I recognize conflict as a much more functional phenomenon as discussed in chapter 2.3.

Conflict is assumed to be a natural part of a relationship and intertwined with how people solve problems through relating in an informal way.

2.7.5 The basic questions

Two basic questions are of particular interest when investigating the sources to conflict in my context: Firstly, when informants from buyer- (representing the project owners) and seller side assess events of conflict, to what extent do they associate conflict with formal- versus informal governance mechanisms? Answer on this question will indicate whether conflict primarily is caused by lack of planning, or caused by weaknesses in handling the unforeseen.

Given the answer on the first question, the second basic question is; If conflict is primarily associated with formal (or informal) governance mechanisms, what are the main threats to improvement of the formal- (or informal) governance mechanisms? An answer on this question will reveal elements that should be improved if a reduction of level and intensity of conflict is warranted.

2.8 How to approach the phenomenon

In the previous chapter I introduced the governance mechanism-construct. In this chapter I suggest "friction events" instead of applying conflict in my interaction with the informants. Furthermore, I argue that the study should be based on dyadic perceptions, from buyer- and seller sides respectively. The dyads should, however, be related to the industrial network of which it is a part.

2.8.1 "Friction events" as a proxy for "conflict" when addressing informants.

There are at least two problems applying conflict in interaction with key informants. Firstly, there is a risk that only a manifest conflict will be regarded as conflict in the day-to-day language. This implies that a number of conflicts in the range prior to reaching a manifest conflict will be suppressed or even denied among the key informants, and valuable information may be lost. Secondly, conflict in economic interaction requires carefulness in interaction with the empirical world in two ways. Firstly, constructs to be used in this interaction are crucial in building trust and openness with key informants. Secondly, the conflict construct is as such difficult to apply, especially in ongoing business relations where there is a risk of self-fulfilling prophetic consequences by addressing a potential conflict as a conflict.

Whenever incompatible activities occur, there is a conflict (Deutsch 1973), and incompatible activities imply friction between the parties. Furthermore, conflict is a sequence of interlocked episodes (Pondy 1967) or events. I therefore introduce "friction event" as the proxy for conflict. The problem is only related to the interaction with informants, and implies no major theoretical difficulties. I will therefore apply the proxy only in interaction with informants. In the following, conflict and friction events will be regarded as synonymous.

Summing up, I argue that applying the conflict construct in study of ongoing business relations is difficult to apply in interaction with informants. Friction event is therefore introduced as a proxy for conflict. The term "friction event" comprises all types of events indicating disagreement between the parties, and is applied synonymously with conflict in the following.

2.8.2 Dyadic project conflict as part of an industrial network

In chapter 1 complex project was characterized as a hybrid with open boundaries embracing a large number of actors. This openness was further discussed in terms of conflict and illustrated in chapter 2.2 where conflict emerging between buyer and seller had implications for actors outside the dyad. This brings in one important element, the embeddedness of the dyadic relationships into the surrounding environment, or network. This implies that the boundary between firms of the dyad and the environment is more diffuse than in the more classical specifications of firm boundaries (Anderson, Håkansson and Johanson 1994). The dyad is furthermore considered playing a role in the network, and vice versa.

This has at least one theoretical implication for my study. Conflict as part of a dyadic business relation is also a part of a broader context called "the project network", which consists of several dyads with the aim of completing the total project. Following Anderson et al. (1994) this implies that conflict is not only decided by dyadic consideration, but by the "project network" as well. This can be illustrated by the statement of one Norwegian project manager, with 27 years of project management experience, who claimed: *"If seller or buyer loses money during the project, every participant will be affected, regardless of who is responsible"*. This is supported by one of the Japanese project managers (31 years of project management experience) arguing that assessment of conflict events is very difficult without knowing the actors and development path of the project. I thus believe that the event per se cannot be fully understood by holding the environment of the dyadic business relations apart. The argument of embeddedness can further be extended to include the "oil industrial network" embracing the focal "project network", and further into the industrial environment in a broad sense.

2.9 Summing up on the phenomenon of conflict

Firstly, conflict was defined as a phenomenon related to incompatible activities made up of a sequence of interlocked episodes. These were further associated with organizational stability, which implies that conflict can play a functional- and a dysfunctional role. Conflict can consist of a single action with presumable limited consequences, but is always embedded in a larger context. This can in some instances cause effect in the whole industrial network.

The context of past empirical studies of conflict was found plain compared to the complexity characterizing a project. The fruitfulness of a positivist

epistemology and objectivistic methodology was also questioned when studying conflict in a complex environment. A literature review of past studies, however, revealed relevant findings for the complex project. Whereas these studies were based on the power construct, I proposed governance mechanisms associated with events of conflict as main construct when searching for causes to interorganizational conflict in complex projects.

To approach the phenomenon I suggested applying "friction events" instead of "conflict events" when addressing key informants. These were regarded as synonymous. Furthermore, a dyadic conflict between buyer and selling parties in a complex project should be regarded in relation to the industrial network embracing the dyad.

My discussion of context and phenomenon has implications for choice of theoretical framework and for methodology. In the following I argue that a complex project, including interaction processes in which conflict emerges, should be interpreted as part of the oil industrial network. Hence the industrial network approach will be discussed in terms of complex projects in the oil industry.

3. Exploring conflict in projects through the industrial network approach

The aim of this chapter is primarily, to assess the industrial network approach as a fruitful theory for understanding complex industrial projects. This understanding is a prerequisite for understanding conflict between the buying project and the selling parties. Basic concepts will be further described and discussed in relation to economic theory. The second aim is to characterize the project in terms of three dimensions. In the first dimension the project will be described in terms of a set of activities, activity links and activity structures. In the second, resources, resource ties and resource structures will be discussed. The third dimension includes a description of the project in terms of actors, actor bonds and actor structures.

3.1 Assessment of the Industrial Network Approach as a theory

3.1.1 What is a theory?

Frankfort-Nachmias and Nachmias (1996) define theory as theoretical systems representing combinations of taxonomies and conceptual frameworks systematically combined. Furthermore the system of propositions are interrelated in a way that permits some to be derived from others. A definition close to this is suggested by Ghauri (1995): "A set of interrelated concepts, definitions and propositions that present a systematic view of specifying relations among variables with the purpose of explaining and predicting the phenomenon". A more liberal definition is suggested by Troye (1994:91) defining theory as "assumptions about relations between phenomena". This definition implies that the primary function of a theory is to understand how and why assumed relations between the phenomena exist. Theories are thus considered more than classifications. Troye's definitions therefore do not include classificatory systems that organize and summarize empirical data, or taxonomies, which provide no explanations but descriptions of empirical phenomena.

3.1.2 Conceptual framework versus theoretical system.

Frankfort-Nachmias and Nachmias (1996) propose four levels of theories along a hierarchical scale, (i) ad hoc classificatory systems, which constitute the lowest and "weakest" level, (ii) taxonomies, (iii) conceptual frameworks and (iv) theoretical systems, which constitute the highest level. Merging

Troye (1994) definition with the 4 level of theories suggested by Frankfort-Nachmias and Nachmias (1996) I end up having two levels of theories: Conceptual frameworks and theoretical systems. Conceptual frameworks are characterized by having a broad structure of explicit propositions and statements of relationships, which may be accepted or rejected. The framework summarizes behavior as well as provides explanations and predictions. Its propositions are, however, not established deductively. Theoretical systems pass the most rigorous definition of a theory with its combination of taxonomies and conceptual frameworks. By relating descriptions, explanations and predictions in a systematic manner, the theoretical system permits propositions to be derived from others. Scope is not limited to one particular aspect of event or phenomenon. Whereas the propositions in the conceptual framework are not established deductively, the theoretical system does form a deductive system. By following their rules, I can deduce some propositions from others.

3.1.3 The basic features of the Industrial Network Approach

Relating the network approach to the dichotomy between conceptual framework and theoretical system, the network approach hardly passes the rigorous definition of a theoretical system. I will argue that it is rather a conceptual framework consisting of 3 basic variables to explain company interdependencies. Knowledge about interdependencies of industrial actors provides a powerful framework for understanding a variety of business phenomena. Its propositions are inductive based upon empirical findings. The framework is, however, based upon many theoretical sources, such as economics, sociology, marketing and organizational science. With further development the framework has a potential for being considered a theoretical system in the future. Nevertheless the network approach still passes the threshold for a theory.

Using this theory the Firm and its business relations are webbed into an industrial network defined as "a set of two or more connected business relationships, in which each exchange relation is between business firms that are conceptualized as collective actors" (Anderson et al. 1994:2). The exchange in one of the parties is thus contingent upon exchange (or non-exchange) in the other relations (Cook and Emerson 1978; Anderson et al. 1994). This further implies that the Firm is considered interdependent with the other exchange party in the dyad, as well as being influenced by other parties outside the dyad.

The Firm is considered as an actor performing activities and employing resources, and the way this is handled have effects on two set of functions. First for the focal dyadic relationship (primary functions) and second, for the network (secondary functions) because any dyadic relation is, directly or indirectly, connected to other relationships (Anderson et al. 1994). Studies of the Firm is thus a complex task involving the challenge of drawing appropriate boundaries for the analysis within a network with blurred boundaries.

3.1.4 The theory's generality and utility in explaining interorganizational conflict.

Troye (1994) proposes 8 criteria for evaluating a theory's value. I find two of them of particular interest in relation to the network theory, the theory's generality and its utility and area of application. Recognizing their benefits and weaknesses one has to realize that no research tradition is optimal. In this respect a difference between a North American research culture for investigating interorganizational business relations and a European can be observed. Whereas the American tradition holds an objectivistic research ideal with emphasis in empirical testing, a subjectivist ontology and methodology with a focus in describing and understanding relationships is characterizing much of the European research in the field. The network approach is a theory of importance within the European tradition.

Generality of the Industrial Network Approach

The theory offers two basic goals or dimensions in understanding relationships, a positional perspective where the firm is focused in relation to its network, and a holistic aggregated network perspective. Generality may therefore differ depending upon which of the two perspectives are applied.

Can the results apply in other contexts? Bearing in mind the assumption of heterogeneity of resources, activities and actors in the theory the results may not fit well into other contexts. Loose connections between actors with unclear boundaries between further enhance the context dependency. A "deep" description of one network thus has limited value in understanding other. On the other hand, a study of one specific network may have relevance for positional studies of other actors in the same network. Nevertheless, the theory rests on the assumption that singular relationship and episodes cannot be understood without knowledge of their context.

How generalizable are the concepts within the theory? The sub concepts of dependencies and interdependencies, actors bonds, activity links and

resource ties stem from several sources and theoretical platforms. These concepts are further applied within a variety of disciplines.

Area of application and utility of the Industrial Network Approach:

Because the phases of research have different motives, assessment of the utility of a theory should be evaluated along different criteria (Troye 1994). Utility should be evaluated in terms of accordance with existing research (external consistency), that its statements and claims allow falsification, has a systematic structure and finally are precise and possible to verify (Troye 1994). This is a precondition for the later stages, empirical testing and generalization. A good theory should further possess empirical support.

To what extent do the network approach correspond with existing research applied for understanding interorganizational relationships? The theory is one out of at least 5-6 theories commonly used in study of interorganizational relations.

Table 3.1 Theories commonly used in studies of interorganizational relations

Theory:	Sources include:
Transaction Cost Theory	(Williamson 1985 and 1995)
Agent-Principal Theory	(Bergen, Shantanu and Walker 1990). (Brickley and Dark 1987)
Political-Economy Theory	(Reve and Stern 1986), (Stern and Reve 1980)
Relational Contracting Theory	(Macaulay 1963), (Macneil 1980)
Interaction Approach	(Håkansson 1989)
Industrial Network Approach	(Håkansson and Snehota 1995)

The theories can be considered alternatively and complementary depending on unit of analysis and the phenomenon being studied. They are all being used and acknowledged albeit representing a pluralistic view on goals, unit of analysis, methodologies, theoretical emphasis etc. The Industrial Network Approach, with its short research tradition, is thus the last theory adding to the list.

One characteristic is the interdisciplinary basis of industrial network theory adding elements from sociology, psychology and anthropology disciplines to economical theory, thus creating a distance to the traditional economic- and marketing disciplines strongly influencing the American interorganizational research tradition.

The Industrial Network Approach addresses both focal and macro network issues. Positional network strategies, technological development between the net actors (Lundgren 1991), international market entry, and a comparison of the nets of a focal firm in different operating countries (Möller 1995b:350) are examples of research issues. In the area of application within a macro perspective, descriptions of the structures and processes that constitute specific industrial domains (Waluzewski 1989), and other studies exploring international cooperative relationships from the network perspective are included here.

How precise is the theory? Basic constructs within the theory such as *interrelationships*, *bonds of actors*, *activity links*, and *resource ties* are not very precise albeit their usefulness in describing complex contexts. I therefore argue that precision is not a main strength of the theory.

How can network approach comply with falsification efforts? I can argue that the more generality the greater opportunities for falsification. On the other hand if generality is traded off with precision, the opposite effect occurs, namely less falsification opportunity. As previously discussed both generality and precision are argued to be rather low, causing a negative effect on falsification opportunities. It can be added that the theory is relatively weak in its explanatory aspect, and weak in its predicative power, based upon measurement problems and context complexity (Möller 1995b). The theory can therefore be difficult to falsify.

How can the network approach comply with the claim of having systematic structure? Its disciplinary roots in systems theory and assumption of interconnectedness between industrial actors support its systematic structure. This can be illustrated by the assumption that changes in the dyadic relation between actor A and B have implications for actor C, which in turn affect the whole network of actors A+B+C++n.

How good is its consistency? A comparison of its goals, methodological practices and ontological/epistemological position indicates good consistency. A subjectivistic orientation fits well into the focus in understanding complex systems of relationships.

A theory's utility is also dependent upon the domain or perspectives of which the theory shall contribute to understanding. Utility may be considered differently in one domain compared to an another. The theorists will for example search for a theory for "more and different phenomena to be explained" whereas the practical will search for a theory explaining "all observations".

For a comparison of my epistemological position in relation to the network theory and in relation to the phenomenon of conflict, see appendix 2.1.

3.2 The concept of industrial network and business relationship

3.2.1 Understanding the firm, market process and market behavior

The traditional way based upon economics- and resource based theories

Two broad streams appear to contribute to understanding of scale and scope of the firm. The first is inspired by Transaction Cost Approach (TCA) postulating the existence of the firm to be alternative to market contracting. It explains the existence and development of a firm from its cost efficiency in archiving a given resource organization under certain circumstances (Snehota 1999). The comparison between market and internal hierarchy is based upon differences in costs of organizing resources. Although it offers reasons for existence of the firm, it does not explain the performance differences between firms (Snehota 1999). The second stream based on Resource-based theories, complement TCA claiming the existence of "knowledge-based transaction costs". The theory assumes that organizational mode (market or firm) affects the kind of knowledge that will be applied, and thus affects the cost of organizing (Snehota 1999). The main theme here is the link between performance and the capabilities controlled by the firm, thus leading up to hypotheses explaining performance variations (Snehota 1999).

Whereas transaction cost theory, broadly spoken, explains the existence of the firm as a result of lower transaction costs compared to applying market as governance structure, the resource-based theory explains the same as a consequence of resources possessed. Both streams, however, assume the existence of the firm as a consequence of a market failure to secure optimal coordination of given resources.

I believe that the notion *Complex project* can comply with the notion *Firm* thus adopting the same rationale behind its existence and market behavior. The project can thus be described as a firm temporarily established for a specific task. Consequently a complex project is assumed to exist as a result of lower transaction costs connected to organize given resources compared to a market.

The alternative way based upon the concept of relationship

Based upon empirical findings within the *Industrial Marketing and Purchasing* (IMP) research tradition (e.g. (Håkansson and Snehota 1995), the role of the firm and nature of the market process and market behavior clearly differ from the research traditions above. This alternative is concerned with three phenomena characterizing the market: The existence of lasting business relationships, dynamic interdependencies in and between buyer-seller relationships forming network structures, and the dependence on evolution of the relationships and dynamics of change. From this perspective the firm is characterized being "no isolated island", having no clear boundaries and no standardized exchange with its environment. This is quite opposite to microeconomics and traditional management literature (Håkansson and Snehota 1995). Furthermore the firm is not characterized from the perspective of organizing transactions rather through the way its relationships are recognized and handled. This view is supported by Araujo, Dubois and Gadde (1998) characterizing the firm as an institution for enhancing and developing capabilities, rather than a mean to reduce transaction costs.

In relation to governance structures, the set of interdependent relationships in terms of network, are by several scholars regarded as something in between traditional market and hierarchy. Compared to the free market it is not the free market invisible hand that governs, neither is it the hierarchically controlled process, but, as an alternative metaphor "a number of hands that meet and thereby achieve coordination" (Håkansson and Snehota 1995).

A brief comparison between the two approaches

Möller (1995a) claims similarities between economic theories such as Transaction Cost Theory (TCA) and network approach regarding the understanding of how business relations function. Both theories accept the importance of social norms, like trust, to govern relationships. With respect to the interplay between economic, social and technical factors in development of relationships, they both correspond. Actors are assumed to develop relationships (bonds) in order to achieve something are also recognized in both approaches. Although the TCA applies the notion of *asset specificity* and the network theory applies *resource ties* both theories recognize the important role of resource features.

On the other side one important differences is apparent. In TCA the transaction is analyzed as an independent unit in itself, assuming no specific connections exist between different relationships. Hence the structure of the firm is considered an aggregate of individual relationships/transactions. According to the Network approach ties between resources can in same way

be within single relationships but also between resources used in several different relationships.

TCA and Network approach can thus be claimed complementary. In a business environment where the important relationships may be limited to dyadic business relations with few important connections between the focal and other relationships in which the actors may be indirectly involved with, the TCA may have an advantage. The Network approach has its strengths when analyzing important and extensive sets of relationships. Studying a complex project with strong interdependent actors in a complex technological- and commercial environment, an independent view of the individual relationship will probably not be sufficient.

3.3 The project as a set of activities, activity links, and structures

3.3.1 Definitions and relevance to a project

An activity occurs when one or several actors combine, develop, exchange, or create resources by utilizing other resources, and can be defined as a sequence of acts directed towards a purpose (Håkansson and Snehota 1989). The fabrication of a hull is a contextual example of an activity from a complex project. Every activity is a link in a chain of activities, referred to as activity links. "Activity links regard technical, administrative, commercial and other activities of a company that can be connected in different ways to those of another company as a relationship develops" (Håkansson and Snehota 1995). Prior to start of fabrication, the final product has to be conceptualized in terms of drawings and assembly instructions. The connection to the next (fabrication) phase is an activity link. Activity structure can be defined as aggregated activity links. The activity link binding "concept drawings" and "fabrication" together is a part of an activity structure consisting of a large number of other links leading up to the final product.

Activity function is a dimension which explains the effects of activity links internally (within the focal company), within the dyad (e.g. buyer-seller) and in relation to third parties (the network). The way "conceptual/drawing"-activity is linked to the "fabrication-activity" has implications on internal effectiveness and efficiency. It can furthermore have implications for the dyadic relation when the customer has a reason to impose changes. Finally the link can influence on the other suppliers' performance of activities to the "fabrication-activity" in the network.

Two of the basic axioms in projects suggested by Hetland (1998) can have a significant importance with respect to the activity dimension. Firstly, the task of a project is unique. This assumption challenges the possibilities to obtain economies of scale through the market, which in turn raises the question of where the boundaries between the market and the project should be drawn. Secondly, the assumed combination of goal orientation and bounded rationality in the project challenges the ability to produce a functional end product. The prevalence of technical interdependencies and bounded rationality may be so challenging that the components constituting the final product simply don't fit.

These challenges can be illustrated through the concepts of activity complementarity, activity similarity and activity interdependence, which will be discussed below.

3.3.2 Two activity concepts

Richardson (1972) provides a framework consisting of two activity concepts, activity complementarity and activity similarity. Whereas the first deals with the sequential aspects of the activities, the second deals with how resources are utilized. The first includes three types of complementary activities, *complementary*-, *close complementary*-, and *systematic close complementary* activities depending on the degree of output specificity (Dubois 1998).

Complementary activity is "representing different phases of a process of production and require in some way or another to be co-ordinated" (Richardson 1972). This implies that activities are related to vertical or sequential dependence. Complementary activities can be coordinated in three ways: By direction within the hierarchy of the firm, by co-operation between two or more independent organizations, or through market transaction. When complementary activities from several activity structures are compared, activity similarities can be detected and thus opening for economy of scale. The "conceptual/drawing"-activity in a project is complementary to the subsequent "fabrication"-activity. If a complementary activity is directed toward a succeeding specific activity, Richardson (1972) introduces the concept of close complementarity. The output is thus intended for specific purposes and cannot easily be used alternatively. Related to the project; the "concept/drawing"-activity is close complementary if it is only intended for fabrication of the specific hull. The point where the activities turn from being general into becoming specific, the complementary activities become close complementary (Richardson 1972).

Whereas the complementary activities can be governed in all three forms co-ordination of the close complementary activities is more restricted. These activities can be carried out either internally or through cooperation with other firms. This implies that the process of conceptualizing and drawing should be carried out either within the same company as fabrication, or in close cooperation with a supplier having a strong relationship with the fabrication yard.

In some activity chains the complexity of the activities are so high that even if a close complementary activity is possible to reclassify as complementary, the activity has to be carried out internally (Dubois 1998). Such activities are labeled systematic close complementary. This means that even if the result of the "concept/drawing" activity has a variety of other possible "customers" than the "hull fabrication-activity", the complexity of the activities prevents outsourcing.

Similar activities are the second activity concept, and address activities that require the same capability for undertaking (Richardson 1972). This implies that a particular resource can be so flexible that it can be applied on more than one activity, thereby possessing economy of scale-properties.

From this follows that both the sequence of activities, indicating the degree of complementarity, and resource utilization, in terms of possible similar activities, should be investigated, in order to reveal location of the most crucial business relationships, and to suggest future profitable company boundaries.

As discussed above, complementary activities sooner or later turn close complementary. The actual turning point can be moved back or forth depending on where the present point is in relation to the optimal point. The optimal turning point is where a close complementary activity producing a specific input for succeeding activity cannot be redesigned to produce a standard input for the same succeeding activity. A standard product can be "moved" from the focal company and into the market, thus activating economy of scale properties.

3.3.3 The complementary/close complementary turning point in a project

The conceptual phase consists of a great number of close complementary activities including detailed technical concepts, risk analysis, budgets, and detailed implementation plans. The activities have probably no alternative than being used for the pre-determined purpose, unless it is possible to find

other oil resources with equal business opportunities. The conceptual phase is therefore carried out for one specific purpose for one specific oil field. It has probably no alternative practical use than adding human experience to the knowledge resource base. Hence a close complementary activity should never be governed by the market.

The next phase, which includes fabrication and construction activities, is less obvious with respect to the degree of activity complementarities. The implementation phase can be considered as being far less creative than the preceding phase. Whereas the former phase stressed finding the proper solutions, the challenge in the implementation phase is to carry out the task with a minimization of resources and with a high productivity (Kolltveit and Reve 1998). Efficiency is preferred to effectiveness, with a strong focus on standardized works procedures, known materials and standards. Searching similarities in other activity chains is therefore highly encouraged.

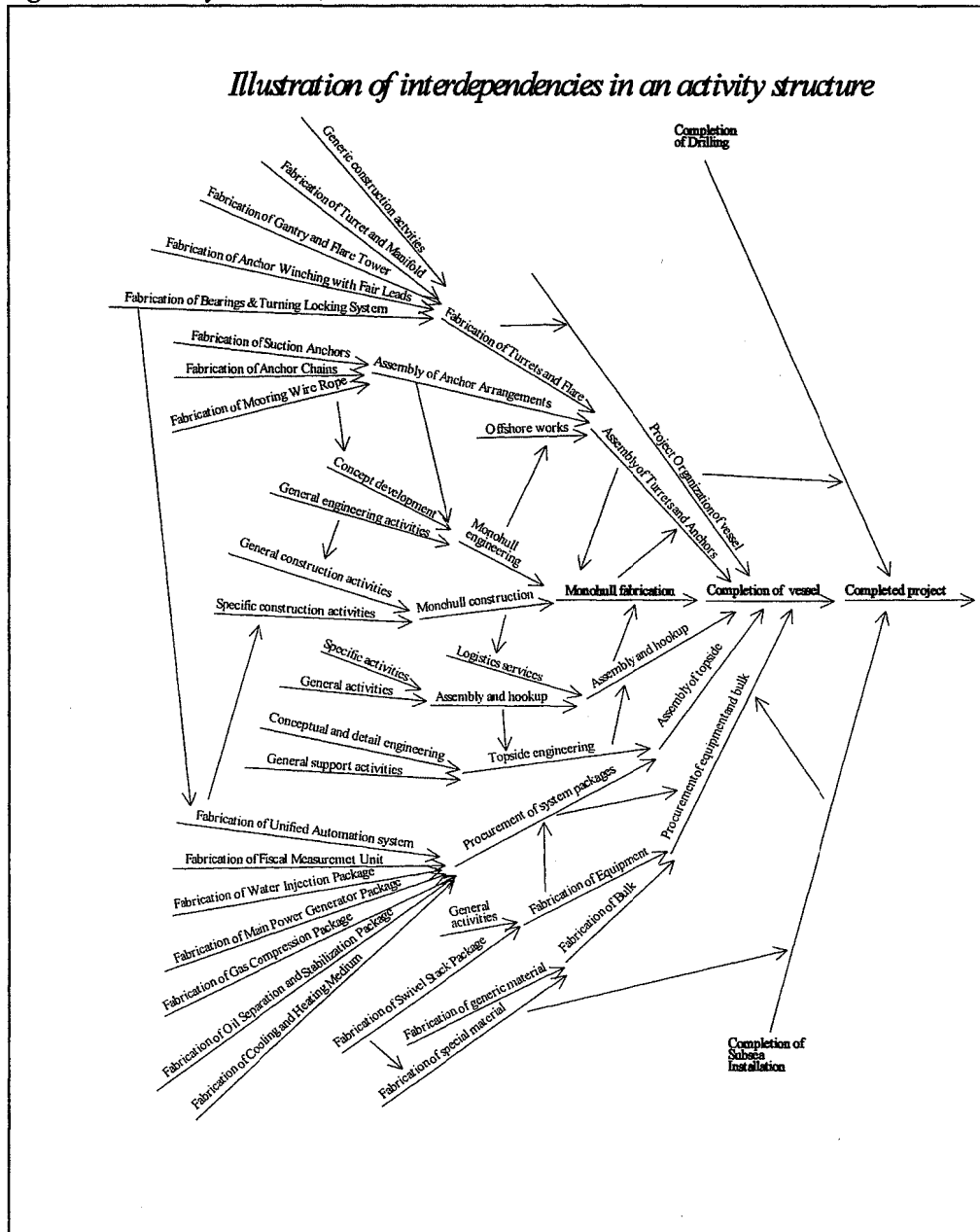
One might argue that the fabrication and construction process could be redirected to other customers and purposes arguing that they are mainly constructed of standard components. In this case a hull for a unique oil production vessel is constructed. This hull can probably, prior to merging with its production unit (topside unit), and turret/anchor system (unit serving the connection to the subsea installations) serve other purposes, for example as freight carrier. With certain customer adjustments and a risk of financial loss caused by loss of time waiting for a new customer to arrive, one could argue for complementary activities in the activity structure at industry level.

On the other hand, the intentional character of the main activities leading up to an offshore construction is to serve a specific purpose, thus representing a close complementarity. The suppliers have invested in specialized assets of a transaction specific kind. The supplier, as well as the customer, are so to say effectively "locked into" the exchange relation. It may also be difficult to suppress the fact that standard components applied in construction are not standardized products anymore when they have been assembled into an advanced technological unit.

Finally it is important to stress that the assessment of activities and complementarities includes several units of analysis. In the preceding discussion the selected unit of analysis for the activities is highly aggregated. In a more thorough activity analysis, a detailed breakdown of sub-activities should be carried out.

The activity structure of the fabrication of an oil production vessel is a web of interrelated activities. Some are physical, while others are exchange of information, as illustrated in figure 3.2:

Figure 3.2 Activity structure, illustration

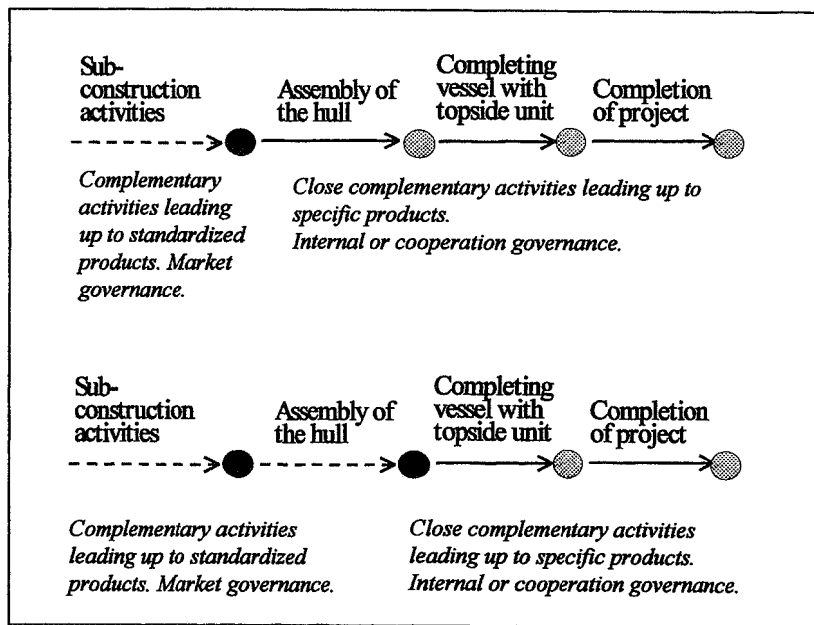


Based on various project material from Norne-project

The dividing line between complementary and close complementary activities is relatively far away from the end product, probably far beyond the first and even second tier supplier. Technological and market specificity, which characterizes complex projects, is the main driver of this classification of complementarities. One can therefore argue that the vast majority of activities in a complex fabrication project should be classified as close complementary activities, with few or no alternative customers or purposes available as illustrated. On the other hand, the borderlines are dynamic and possible to challenge. A close complementary activity can thus be altered to become a complementary activity for activating economy of scale properties. Accordingly the following propositions regarding the activity borderlines can be suggested:

1. The closer to final completion, the higher the degree of close complementary activities.
2. There are always close complementary activities with the potential for being produced more effectively by the market or by cooperating with business partners, than pure internal production.
3. The activity turning points are dynamic targets that have economical consequences.

Figure 3.3 Alternative activity borderlines



3.3.4 Discussion of activity interdependencies

One activity is a part of interdependent activities in several chains. These sets of activities can be more or less adapted to fit into activities carried out by directly and indirectly related counterparts (Håkansson and Waluszewski 1999). Dubois (1998) suggests three types of such activity interdependencies: vertical interdependencies, technical interdependencies and horizontal interdependencies. Vertical interdependencies simply describe the connectedness to preceding activities of which the focal activity is a consequence. If this activity is not an "end station" in the chain, other activities are yet to come. Sequential aspects or time aspects may cause vertical interdependency. A complex project can thus be described as numerous and long vertical interdependent activity chains characterized by sequential- and time constraints. Horizontal interdependencies refer to activities going on in parallel to the focal one. These may have an impact on how resources are directed, distributed, and utilized.

Technical interdependencies.

Technical properties in activity A might have consequences for activity B. If B is located at a remote area in the activity structure, a change in activity A may cause a severe problem when the other activities following B and A merge at a later stage in the chain. A complex project is vulnerable to this phenomenon, which is illustrated by e.g. the production vessel. The hull was fabricated in Singapore, and the topside production unit was produced on the other side of the world as a complex process factory. The two units were merged, revealing a variety of problems caused by technical interdependencies hard to identify further up in the activity chains. The fundament of technical interdependencies, however, started at an earlier stage, e.g. in the conceptual phase of the project. The issue of technical interdependencies is particularly critical at this stage, because technical concepts, including fabrication strategies are frozen here, hence introducing possible incompatibility in the upcoming fabrication process.

The causes of technical interdependencies can be separated into three groups (Dubois 1998):

- between specific products/system, (e.g. the hull has to fit the topside-unit)
- between a product/system and a resource unit, (e.g. fixed installed dies have to be capable of bending a new steel quality introduced)
- between resources activated, (e.g. painting carried out in Asia and in Norway has to follow the same process in order to be accepted by classification authorities)

3.4 The project as a set of resources, resource ties, and structures

3.4.1 Definitions and relevance of a project

A resource is a relative concept, rather than an element in itself (Håkansson and Snehota 1995). It is heterogeneous and assumed interdependent with other resources it is combined with. The combinations for use are unlimited and accordingly never possible to finally specify. This can be illustrated by the resource possessed by the steering committee for governing licenses for an oil field. This resource is among others combined with skills in the educational business, and a new graduate course in "Governance of oil fields" is marketed to foreign countries.

Resource ties connect various resource elements (technological, material, knowledge resources and other intangibles) of two companies. "Resource ties result from how the relationship has developed and represents in itself a resource for the company" (Håkansson and Snehota 1989). Resource structure, also referred to as resource constellations, can be described as a build-up of resource ties.

All three of the axioms, suggested by Hetland (1998), seem relevant. The task is unique and addresses the importance of availability of highly specialized resources. It also raises the question of how the project gains access to resources necessary to secure innovative solutions. The project is considered final and multidiscipline, and addresses the risk of keeping obsolete internal resources. On the other hand, there is a risk of losing crucial resources for subsequent projects if the business relations are too short lived and only focus on the current project. This further stresses the importance of having access to, rather than controlling resources through ownership. Assumptions of goal orientation and bounded rationality are relevant because good solutions in a project are dependent on new resource combinations. The problem is to find the proper combinations. Technological complexity and bounded rationality complicate the specification as to what resources are really needed, and when.

3.4.2 The project and its external capacity reservoir

The firm is dependent on resources controlled by other firms, and access to external resources through the company's position in the network (Johanson and Mattsson 1991). This access provides the firm with capabilities beyond

what is possible in the hierarchically integrated firm. Firms can thus be described as institutions for enhancing and developing capabilities, rather than institutions for reducing transaction costs as claimed by the transaction theory (Araujo et al. 1998). These resources can be governed either by direction within the hierarchy of the project core team, by co-operation between the project core team and one or more independent organizations, or through market transactions. The internal resources in a complex project, provided by its own base organization, are only a minor part of the total project resource constellation. In this respect the project may thus be characterized as an externally provided capacity reservoir allocated for a limited period of time.

It is not unusual for a conventional firm to experience imbalance between the resource needed to accomplish its tasks and its resource base. This imbalance is caused by years of accumulation of skills, facilities and equipment, more or less useful today. A distinction between the access to, and the control of resources is therefore fruitful. The market offers access, and the firm allows control. The immediate conclusion is that the control has substantial advantages, but is likely to be more costly than access (Loasby 1998), and finally: I can access more than we can control.

For a conventional firm, pooling and redistributing these resources among different firms in its network reduce "slack". The project on the other hand has a somewhat different situation. Its provenance is grounded on applying the resources available in the network. It thus has no initial resources or "slack" in its own. Whether its base organization has "slack" or not, is another issue. In this respect the network is not used for reducing "slack", but for providing the required resources.

3.4.3 The resource structure of a project

Resource constellation

Some of the resource ties connect different internal resources, and others cross company boundaries. Connecting ties thus form a structure labeled resource constellation which "points to the fact that the resources a company provides or uses are tied directly to those with which the company has direct relationships and also to those that are indirectly connected", (Håkansson and Snehota 1995:138). Due to the heterogeneity of resources, it is impossible to map all the qualities hidden in a resource and it is always possible to develop new features of it (Håkansson and Waluszewski 1999:12). "Two heterogeneous resources which are combined, can usually, through experience in use, become more specialized in their combined use

and lead to a higher combined productivity, a higher degree of complementarity and increased interdependence between them" (Johanson and Mattsson 1991:207). The resource constellations have three consequences for the project:

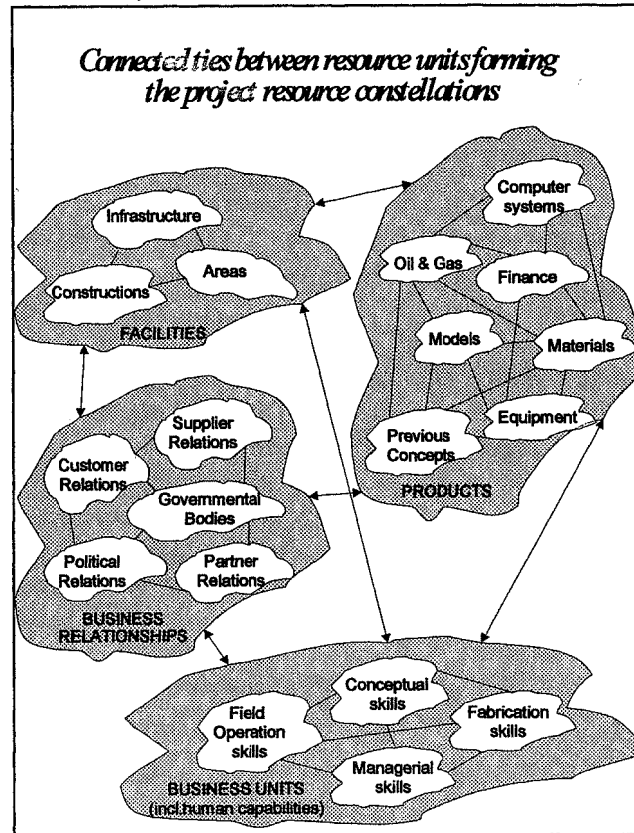
Firstly, the value of a given resource is dependent upon the number and strength of ties of which it is connected. Example: Capital is a crucial resource strongly connected to nearly all other resource items. Without this specific resource, very few other resources have value.

Secondly, the resource can be connected to different types of resources. Example: Capability in a certain conceptual engineering discipline may impact on the requirements for heavy cranes on a construction site, with a further impact on requirements for financial resources.

Thirdly, joint action across company or project boundaries plays an important role. Example: The mentioned engineering skill is particularly valuable if more than one actor is able to carry out the potential of the resource.

The connected resources can be identified in several ways and dimensions depending upon their purpose: Products, facilities, business units, and business relationships.

Figure 3.4 Resource structure, illustration



Business Units

Ability to co-operate is crucial, and within this business unit human capabilities are found. These capabilities can be characterized as social units with knowledge and ability to work together with certain counterparts (Håkansson and Waluszewski 1999:12). The value of these resources or skills is, however, dependent upon their combination with other skills. A skilled geologist knowing where oil is located is of limited value unless combined with the conceptual engineering skills that provide technical solutions for the oil well to be drained and processed. This interdependence is not only a static issue it rather represents a dynamic force with effect on how resources can be combined in new ways. An interaction between a company A with specific skills within seismic, and a company B with specific skills in 4-dimensional computer graphics, may well end up with the development of a new skill which opens for new exploration of previously abandoned oil fields. An important feature of this resource is its embeddedness in other business units, as well as in other types of resources such as facilities and products.

Products

The traditional view of economic exchange assumes that the product is taken for granted. It can, however, be argued that industrial buyers and sellers rarely regard a product as given (Håkansson and Waluszewski 1999). Product adaptations to customer requirements and joint specification development are examples of interaction leading up to new features, form and function of the resource. A project is for example dependent upon well developed computer systems. These have most certainly been developed as a result of tight interaction and strong ties between buyer and seller, and not as "faceless" product innovations solely within the boundaries of the firm.

Facilities

Facilities are used for producing or using, and include infrastructure and telecommunication lines. Empirical evidence shows that companies have recognized the possibilities of reducing costs by connecting facilities to each other (Håkansson and Waluszewski 1999), thus finding and utilizing more or less well-known latent features. Offices and high speed data networks can be effectively connected for a smooth worldwide operation allowing skills in geographically remote areas to be involved in the concept development.

Business relationships

The resource labeled "business relationships" is used for networking, and is perhaps the most significant resource of all. It cannot be copied or reproduced, and its value does not diminish with use, as with other resources. Good business relationships make uniqueness possible through extensive use of resources made available by other actors in the network, to which own resources can be added.

In the project business relationships and networking activities can, for example, materialize in joint industrial efforts to change the tax regime in order to make a marginal oil field profitable in spite of a low oil price. A further consequence of this relation can, in the next turn trigger counteracting forces, in terms of emerging relations between political parties, media and governmental bodies. Interaction through networking is thus a consequence of the resource labeled "business relationship".

The claimed interrelatedness among the four categories leads up to the assumption that "all are clearly defined in relation to other resources" (Håkansson and Waluszewski 1999:13). All four have economic features besides physical and social features.

The resource constellation possesses two contradicting features, stability and variety (Håkansson and Snehota 1995). A risk of losing specific computer

experts will probably be counteracted to regain stability if the experts are connected to a large number of other resource units. Variety can be illustrated by a large new oil field ("product resource") causing direct or indirect effects for nearly all resource combinations within the oil industry.

3.4.4 Resource mobility and dynamics

"Capabilities are endogenous, and should be analyzed in the context of change, response to change, preparation of change, and the generation of change" (Loasby 1998). The recognition of resource dynamics is also addressed by Reve (1990) which argues that asset specificity should not be regarded as given, but subject to a learning curve. A specialized asset finds other use through experimental learning, and the boundaries between firms may have to be adjusted as actors move along a learning curve. This is supported by both Lundvall (1993) and Dosi (1997), that argue that the most important learning process is not the one going on within, but the one going on between companies. Accordingly, resource development has to be understood as a dynamic and interactive phenomenon.

The constraints in moving competence are few in an international market where people are used to being transferred between projects, not only within the same company, but between competing companies as well. Similarly the concept development can be located anywhere due to heavy reliance upon computer infrastructure.

3.4.5 Interdependencies

Resource interdependencies are relevant on three levels, (i) within the resource unit, (ii) between the resource units, and (iii) between specific resources in the focal project and other companies or projects.

(i) Interdependence within the resource unit.

Within the group of business units "fabrication skills", "conceptual skills", and "managerial skills" are strongly interdependent. Without proper construction plans and management of the project sequential activities, "fabrication skill" is of limited value. A weak supplier focus caused by lack of management resources may cause critical delays and poor quality in purchased materials leaving 50 skilled workers unemployed until recovery of the supply chain.

(ii) **Interdependencies between the resource units:**

The facility used for construction of e.g. a production vessel requires certain skills to operate and the business unit called "fabrication skills" is one of these. A strike caused by a wage dispute would limit the access to the "fabrication skill" and most certainly affect the value of that facility ("site resource") for a certain period of time.

(iii) **Interdependencies between resources in the focal project and other companies or projects:** A shortage of certain capacities (e.g. docking) for one of the contractors may be solved by means of activating resources elsewhere with available capacity. These resources can be made available from other geographical areas, or from other parallel projects.

The main point in this discussion is that resources have to be combined with other resources in order to be valuable. The adjacent resource unit hence provides a condition for focal unit to remain valuable. This interdependence of resources includes internal resources within the context of the individual project, as well as external resources activated through other projects in the industrial network. Interdependencies are both a value and a constraint. Constraint in the way that problems, conflict and disputes in one resource unit easily cause effect in other units, and value in terms of mutual benefit from a wide resource reservoir.

3.5 The project as a set of actors, actor bonds, and structures

3.5.1 Definitions and relevance to a project

Actors control activities and/or resources and develop actor bonds with the persons or institutions they interact. The actor bonds influence on how the two actors perceive each other and form their identities in relation to each other. The bonds web the actors into actor structures, referred to as networks. The focal project (actor) has, for example, interaction with one specific supplier (actor) regarding development of technical solutions (bonds), thus being one of several such interactions going on (actor structures).

Referring to the proposed project axioms of Hetland (1998) the uniqueness of the task, limited duration and combination of intentional behavior and bounded rationality have implications for how we understand the actors. Uniqueness involves assumptions of high risk, which in turn puts a pressure on the interacting parties, which in the next turn often is enforced by detailed contracts. The contracts may subsequently jeopardize the informal business relations that are a prerequisite for supporting innovation and effectiveness.

The limited duration of a project may motivate opportunism. The fact that the roles of principal- and agent exist side by side in a project (Hetland 1998) may further enhance this challenge. Who are the third parties who have an effect on crucial parts of the project development pattern? How can those actors be managed into a supporting position? Those questions address the bounded rationality aspect of the complex project.

3.5.2 The project as an actor among actors

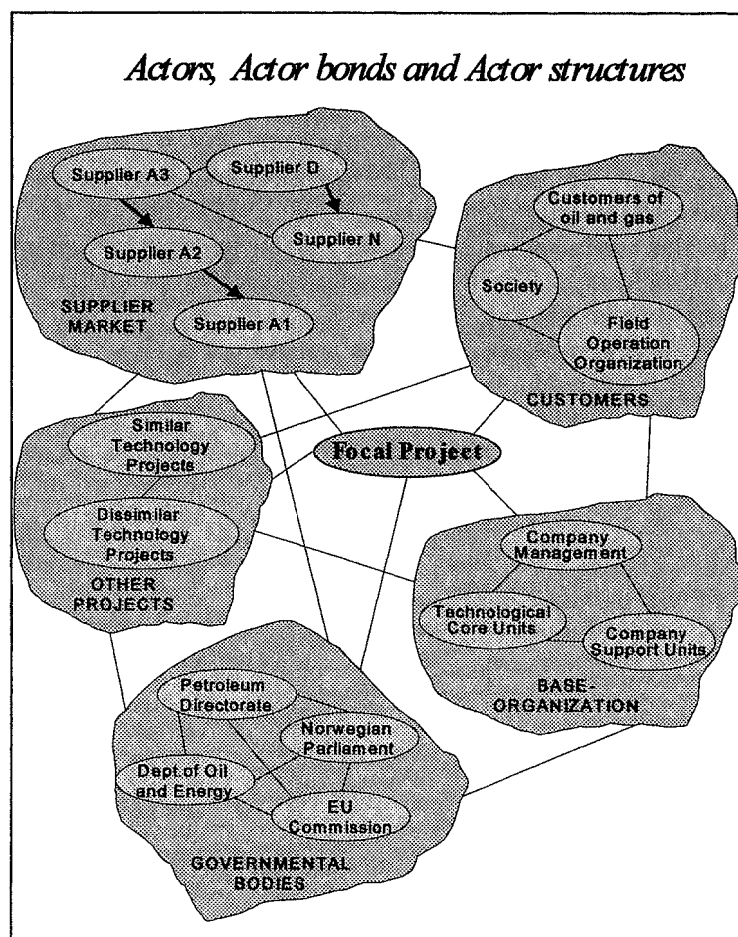
Håkansson and Johanson (1988) suggest five characteristics of the actor: Firstly, the actor performs and controls activities (e.g. project management activities are coordinated by authority mechanisms). Secondly, the actor develops relationships with others through exchange processes, e.g. buying from the supplier market, or applying local authorities for approval of deviations from night work regulations. Thirdly, the actor bases activities on the control of resources through ownership or through relationships. Fourthly, the actor tries to gain control of the network. This can be illustrated through competitive bidding for new oil fields where several oil companies fight for market shares, or when project core teams try to claim priority on the expense of others when a contractor is running out of critical capacity. Fifthly, the actors have different knowledge about activities, resources and other actors in the network. Assuming bounded knowledge in a complex environment, no actor can embrace all the complexities of the environment of which he is a part.

The actors can be defined on several vertical levels and identities ranging from the individual level to industry level. For example: the individual allocated to the project, the core team of the focal project, the focal project organization, the oil company or companies owning the project, the Norwegian oil industry, the international energy industry etc. The boundaries between the groups of actors and the number of actors are arbitrary, but are for the purpose of this paper divided into five groups embracing the focal project.

As illustrated in figure 3.5 the supplier market includes a large number of actors. Some of them are present (broad arrows) suppliers and sub-suppliers, and other actors do not currently serve the focal project. Customers include the Project Operation Team which will have the final construction unit handed over for operation after fabrication and completion, customers of oil and gas, and finally the society having stakes in the business in a variety of settings.

The base organization and governmental bodies are also groups of actors who affect on the focal project, and who at the same time are being affected by the project. Other projects going on at the same time, which more or less compete for same resources, are also represented. They all are assumed to have specific identity, motives and intentions acquired in interaction with others.

Figure 3.5 Actor structure, illustration



3.5.3 The bonds in offshore fabrication projects

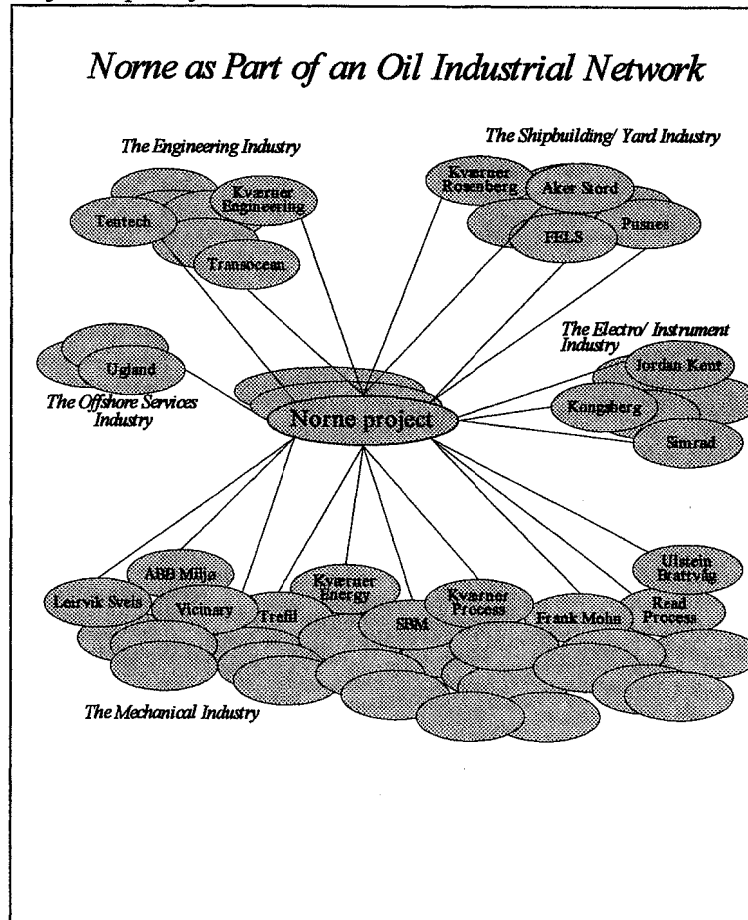
Actor bonds are used to understand processes of social exchange. At the same time this gives rise to commitment and trust between the parties (Håkansson and Waluszewski 1999). One can thus question the rationale

behind the detailed contract. Is the role of the contract a consequence of low trust and commitment caused by weak actor bonds? And is it even possible to generate enough trust and commitment among parties connected to a temporary "firm" established for a unique and complex task?

The actor bonds in a complex project can probably be described in at least two dimensions. One is the informal "soft" relational dimension including trust and expectations of a long-term business relationship. The second dimension of project actor bonds includes "hard" and authority based formal governance mechanisms with bilateral contracts acting as safety nets. It is hard to understand the actor bonds without recognizing the interplay between these as the two modes penetrate each other (Reve 1990). It can thus be argued that "hard" and authority/power based governance complements the "soft" negotiation based governance as proposed by Reve (1990). On the other hand this interplay can be contradictory in the way that the contract reduces willingness and ability to develop trust and expectations beyond the judicial documents, and supportive in the way that the formal dimension reduces risk for both buyer and seller. To get access to and exploit new activity and resource combinations thus depends on how this interplay is handled.

The role of the contract is often considered very important, and probably far more important than the relational mechanisms from the perspective of the operational or administrative level of buying and selling parties. It can thus be argued that the importance of formal contracts compared to relational governance mechanisms is a matter of what organizational level is focused. The company board of directors and CEO can thus have a far more relational focus on the supplier-project interface than the administrative- and operational levels of the organization.

Figure 3.6 The Project as part of an oil industrial network

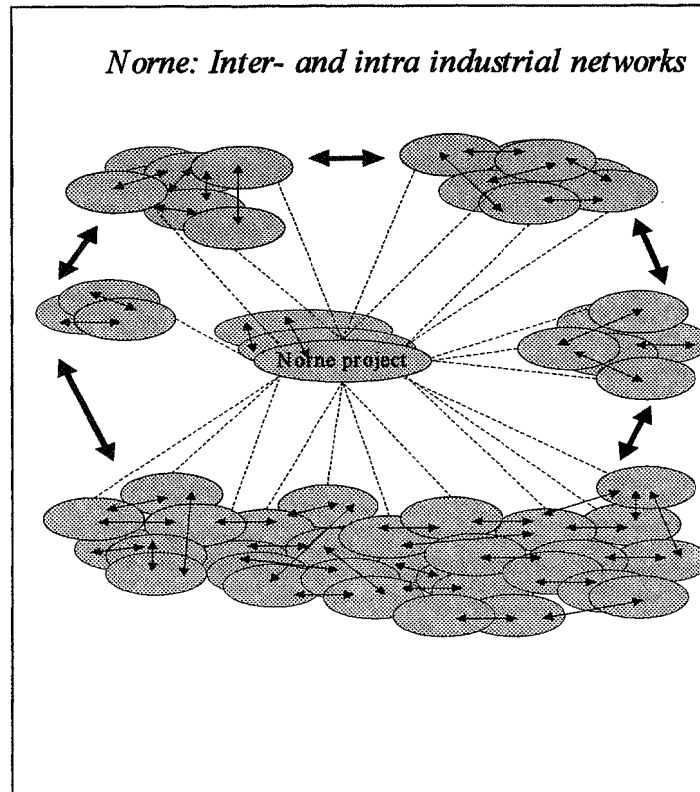


Strengths and other characteristics of the bonds may vary depending upon historical patterns of interaction, perceptions and previous experience. The more interaction, the stronger the bonds. Furthermore, the relations with regards to resource interdependencies and activity links add identity to the actor bonds. With respect to the largest suppliers and contractors of the focal project, these identities are partly formed by contracts, but reach far beyond the contractual level. One can suggest that social bonds developed between individuals in the focal project and the supplier are stronger than the bonds derived from the formal contracts. In this context I refer to Macaulay (1963) who argued that social relationship can be more effective than formal contracts in business relationships.

3.5.4 The project's identity in the network

Development goes on among the actors in the different supplier industries on which the focal project is dependent. New activity- or resource combinations can be developed in close interaction between a concurrent project and their suppliers. These suppliers, being "members" of the supplier network, will perhaps be activated later, thus allowing new solutions to be used in a new project. Technical innovations that emerge in bonds between various suppliers, industries and concurrent projects, although not directly connected to the focal project, should therefore not be neglected. This is illustrated below.

Figure 3.7 *Interconnection between actors, illustration*



These bonds affect the behavior and identities of the interacting parties. The position of the actor depends on which actors the focal actor has exchange relationships with (Johanson and Mattsson 1991). The position of the actor changes all the time, not only because new exchange relationships emerge and old ones change character, but also because the counterparts' position is

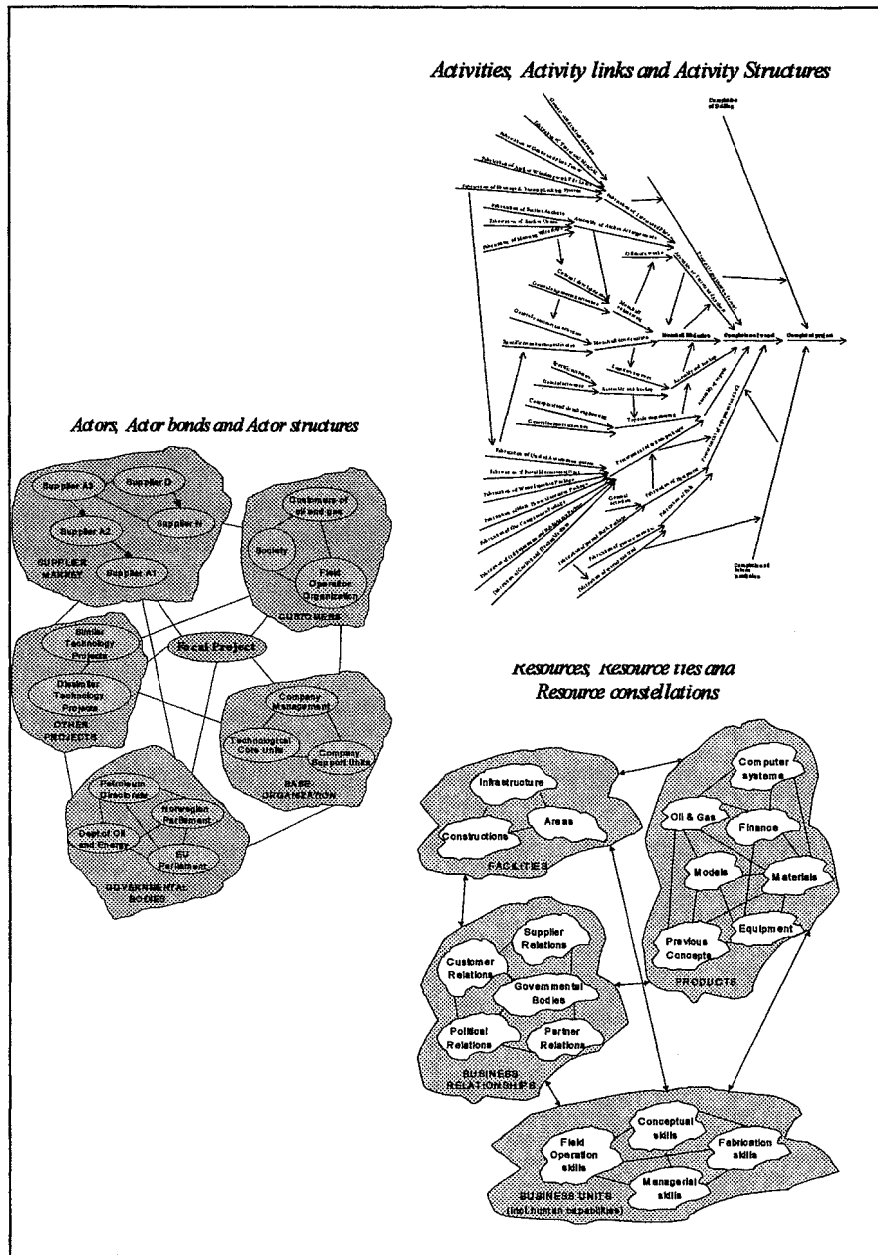
changing. Furthermore, the positions of third parties, with whom the focal actor has no direct relationships, are also changing (Johanson and Mattsson 1991). A breakdown in bonds between a focal company and a customer may easily affect "innocent" third parties more or less related to either of the two sides. The degree of influence is dependent upon where they are positioned in the network in relation to the problematic relationship (Hadjikhani and Håkansson 1996).

It is necessary to acquire meanings in other actor's perceptions and behavior to be an interesting and valuable partner. (E.g. referrals and testimonials when evaluating suppliers.) "In order to survive and develop they have to attract interest and resources and to elicit action from others. To achieve that goal they must be perceived by others as a distinct, intelligible entity; a company has to acquire the identity (the meaning) of an actor in the eyes of other" (Håkansson and Snehota 1995:138). This implies that a supplier holding an attractive resource base may easily exclude one potential customer of limited strategic interest. In an agent-principal perspective the agent can easily change role from being an agent into a principal to the customer because the position in the network permits it.

3.6 The synthesis of interrelationships

The business relations, whose understanding of the firm rests in the network perspective, are characterized through the three dimensions illustrated below. "The interplay of the three dimensions is a driving force in the development of business relationships" (Håkansson and Snehota 1995:35). It is these relations that the main determinants of a company's performance is found. Each of the dimensions are assumed to form independent networks in their own right, but the totality of a market network can only be captured through an integrated view of the relationships among all three dimensions (Easton and Håkansson 1996). I therefore have to combine figure 3.2 (activity structure), figure 3.4 (resource structure) and figure 3.5 (actor structure) in order to grasp this totality. This is illustrated in figure 3.8.

Figure 3.8 An integrated view of the three structures (figure 3.2, 3.4 and 3.5 above)



Three units of analysis are available for functional analysis, the individual company, its dyadic relation and the network. Combined with the basis construct of actors, resources and activities, a framework for analysis emerges. The 8 analytical areas below concur and deserve attention.

Table 3.2 Levels of analysis, actors, activities and resources

	<i>Company</i>		<i>Relationship in dyad</i>		<i>Relationships in network</i>
<i>Activities</i>	Activity structure	↔	Activity links	↔	Activity pattern
			↕		
<i>Actors</i>	Organizational structure	↔	Actor bonds	↔	Web of actors
			↕		
<i>Resources</i>	Resource collection	↔	Resource ties	↔	Resource constellation

Source: Håkansson and Snehota (1995)

The analytical areas can be applied to a variety of phenomena. With the phenomena of conflict between actors involved in a project context the 8 elements will be exemplified:

Table 3.3 Conflict and problem dimensions

Problem dimension	Example from the phenomenon of conflict	
	Possible effect	Possible cause
Activity structure and activity links	Supplier does not deliver in accordance with latest specifications	Internal project planning is not coordinated with supplier activities.
Activity links and actor bonds	Deviations between actually delivered performance and contractual requirements	Individuals of supplier and project agreed on changes without compliance with contract.
Activity links and activity pattern	Modules from suppliers A and B do not fit properly	Unawareness of technical interdependence between module A and B. Deficits in contracts and in management interface activities.
Organizational structure and actor bonds	Very strong disagreement between supplier and project about a technical solution to an unanticipated problem.	The supplier is strongly functional organized compared to the multifunctional project, causing misunderstandings.
Actor bonds and resource ties	Severe supplier delays are not communicated.	Supplier lacks a specific resource available through the project. Project and supplier are both unaware of this owing to bad relations
Actor bonds and web of actors	Project claims priority on the expense of other rival projects, which supplier rejects.	Project unawareness of strong cooperation between supplier and its other customers, causing loyalty to rival projects.
Resource collection and resource ties	Project identifies possible improvements through utilization of shared resources	Too weak resource ties to supplier. Unawareness of joint learning by mutual exchange of personnel.
Resource ties and resource collection	Project control systems are incompatible with the majority of supplier systems	Project unawareness of old computer standards in the supplier organizations

3.7 Concluding on use of theory

Applying a network approach in understanding complex projects has at least two important limitations. Firstly, network as unit of analysis is aggregated

to a level where it is hard to falsify its propositions, mainly because of the numerous variables included. Some scholars within the inter-organizational relations-field are accordingly reluctant to fully support this approach to interorganizational phenomenon. Secondly, I have to admit that although behavioral elements embedded in business relationships reveal important aspects of a complex project, hierarchical elements including authority and fiat are also parts of reality. The hierarchical element is claimed to exist within the organization as well as in interorganizational exchange. Sometimes it is more apparent than we want. On the other hand, strong arguments support the application of the network approach to understand complex projects. Recognition of relation elements, the open boundaries and recognition of interdependencies are fruitful in understanding phenomena within a complex project, both in terms of structure, and in terms of its dynamics properties.

With the complex project as point of reference I have exemplified the basic ideas behind it in terms of activities, resources and actors, and related links/ties/bonds and structures. The framework seems fruitful for describing the complexity in heavy idiosyncratic projects with high technological and commercial uncertainty. Furthermore the empirical evidence gained from previous studies seems to be supported by the characteristics of the complex project. Both the existence of long lasting relationships, the interdependencies and the dynamics of change seem to prevail in this context. This implies that relationships are very important ingredients of the structure governing the supplier-project interface, and perhaps more important than the bonds maintained by hierarchical control.

Through the discussion of the complex project in relation to the industrial network perspective it is assumed that relationships have a strong impact on the economic performance of the project. At the same time the project cannot unilaterally control and decide the development of relationships because they are embedded in a larger whole that affects both the outcome of the project and the development potential materializing in succeeding projects.

4. Epistemology and methodology

In the preceding chapters I have argued that the phenomenon and context play a major role in choice of theoretical framework and methodology. The open boundaries between the project and surrounding actors, and interdependencies of actors and activities were two crucial arguments in applying the industrial network approach.

The objective of this chapter is to discuss the methodological implications of context, phenomenon and theory. In chapter 2 I argued that a hybrid (such as a project), and a social phenomenon (such as conflict), require strong methodological consciousness, and more flexibility than following the stream of previous studies of conflict. I therefore start with a discussion of my epistemological position in relation to conflict, and continue with a discussion of different methodological choices. Finally I argue that an explorative study based on partly a quantitative- and a qualitative study for my two basic research questions, is fruitful for the exploring the phenomenon.

4.1 Approaching business intimacy

How can a sensitive area such as conflict in business relations be analyzed? And what if I add that the investments involved are heavy, idiosyncratic and characterized by a high degree of specificity? If I further add that the relations are technologically complex, involving considerable functional as well as financial risk, and that the transactions have a low frequency, we are close to the phenomenon and the contextual starting point.

An empirical study is dependent upon access to valid empirical data, and a crucial question emerges: Why would a selling business manager reveal conflict matters to a researcher, when the same researcher the next day approaches the buying manager on the same subject? Disclosing delicate matters in a business relationship may easily jeopardize future business. If the researcher is allowed access to the key informants, how can he/she be sure to reveal "true" perceptions of conflict, and not opportunistic "half truths"? And if they really do want to tell the "truth", what measures should be used to assess this "truth"? These dilemmas will further be included in the discussion of epistemological and methodological aspects that will build the philosophical fundament for investigating the phenomenon.

The phenomenon of conflict can be approached from at least three different philosophical angles: From a subjectivistic-, an objectivistic- and hermeneutic approach. Applying a subjectivistic view I run the risk of losing a realistic perception of the world, thus opening for law-like generalizations. From an objectivistic angle of attack I risk losing the subjective perspective and the assumptions of the voluntary human nature. From a hermeneutic angle of attack, I run the risk of interpreting the phenomenon out of its point of origin and jeopardize any scientific validation efforts. Any angle of attack thus provides both a shadow as well as an opportunity to shed light on the phenomenon. It is therefore crucial to carry out a thorough assessment of the nature of knowledge of the phenomenon (epistemological positions), theories and the ways to study the phenomena (methodology) in relation to the nature of the focal phenomena (ontology) (Möller 1995). They all have to be consistent.

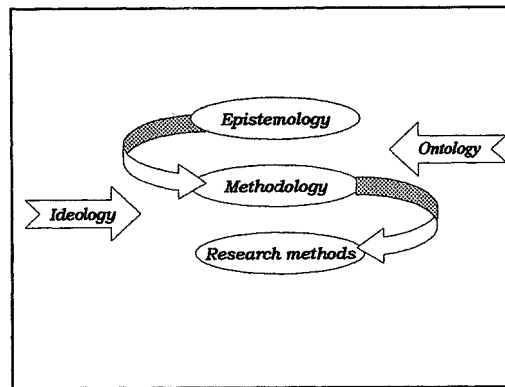
4.2 Epistemological point of view

In order to understand the phenomenon of conflict it is necessary to base the scientific approach on a set of basic assumptions. Through epistemology, the foundation for this is examined in terms of the nature of knowledge and how it works. By examining the assumptions behind knowledge claims I can better understand the variety of scientific approaches leading up to the knowledge, and decide which theory is the most fruitful. My epistemological position will further have a bearing on methodological choices, as well as research design.

4.2.1 The process from epistemology to research methods

Several scholars stress the importance of harmonizing epistemology, methodology and research methods lying behind the research problem. This can be illustrated by a research process framework suggested by Easton (1995).

Figure 4.1 Framework epistemology, methodology and research methods



One factor influencing on epistemology is *ontology*, which pertains to the basic assumptions about the world and how it functions, and is a process of recognizing my constraints in understanding that world. The word consists of the Greek word *on*, meaning "what the world really is" and *logos* meaning the learning about the world that I try to describe. From this follows the acknowledgement that there is a gap between the reality, which I cannot know due to our human limitations in understanding reality, and our description of it. This recognition is helpful in our efforts to understand, in spite of our running the risk of "dubious" simplification.

The phenomenon bridges this gap between reality and the way I describe reality. The problem is, however, that the phenomenon is insufficient both in terms of reality (*on*) and in terms of learning (*logos*). It discloses reality on the one hand and conceals reality on the other hand, because in our efforts to explain the phenomenon I apply imperfect categories and references. Referring to the phenomenon of conflict, I try to explain one reality of interorganizational relations. Thus the phenomenon does not fill the role as a perfect mirror of reality, nor does it serve the perfect role as a goal for description. Nevertheless this it is crucial for bridging the gap. It is therefore highly appropriate with humbleness in our search for claims of knowledge.

Through ontology I recognize our constraints in understanding the world. Epistemology on the other hand is our "toolkit" for understanding that world. Based upon the Greek word *episteme*, meaning science or knowledge, epistemology opens for a critical review of the way I treat and apply science. With a starting point in the logic of science I review principles, methods, hypotheses and results. I thus discuss the validity of our efforts to describe the reality based upon conditions with main reference to logic stringency, our values and our constrained capabilities of understanding.

Ideology is a second influencing factor of epistemology. Stemming from the Greek word *idé*, meaning "mental imaginations", awareness of ideology opens for a review of our mental ideas, their point of origin, and how they affect our efforts in describing phenomena in a valid way. Acknowledging the influence of ideology the evaluation of epistemology should be carried out along two dimensions. The first pertains to the conditions, values and constraints applied for a logical validation of the phenomenon to be described. This can be carried out through a review of the different methodical archetypes (see below). The second dimension involves an ex ante evaluation of how and why knowledge developed the way it did. (E.g. why did people believe that the earth did not orbit the sun prior to the "new" knowledge claimed by Copernicus?). The influence and distribution of epistemological archetypes and positions are thus contingent upon the history of ideological streams, giving a further reason for acknowledging the humble researcher.

4.2.2. Epistemological orientations and their relevance for studying interorganizational conflict.

Epistemology reveals "the philosophical basis for claiming to know what I know; the substantive basis for our knowledge claims" (Easton 1995:370). Or in other words, how can I believe ourselves or prove to others, that I know something? Although there are different ideals for claiming this knowledge, scientific knowledge is knowledge that can be validated by both reason and the evidence of the senses (Frankfort-Nachmias and Nachmias 1996). With those ideals, in the form of epistemological positions, I have to make a choice of methodological approaches.

Three different archetypes of epistemology are common, *axiology*, *hypothetical-deductive method*, and *hermeneutics*. Axiology is driven by logic, such as the disciplines of abstract geometry and algebra. It consists of untestable statements or assumptions about the phenomenon, from which further propositions are deduced. Stringency and elegance are more important than claiming empirical evidence behind the assumptions. The hypothetical-deductive method focuses on influencing the phenomenon, like the discipline of physics, where empirically based assumptions are the basis for the elaboration of testable theorems. The theorems are further deduced for prediction of phenomena, of which its observations are used to adjust or confirm theorems and the grounded theory upon which it is based. The last of the three archetypes is hermeneutics, which is inspired by philosophy. Understanding the entirety is claimed through its parts, and its parts are

understood through their entirety to which they belong. The role of context and language is therefore crucial in the interpretation leading up to knowledge claims. No archetypes are found in pure form. This implies that hermeneutics, for example, do have some influence on both axiology and the hypothetical-deductive method. This boils down to the issue that understanding theories and selection of fruitful scientific "tools" assumes an ontological consciousness and ideological awareness.

A discussion of my position in relation to the three archetypes will be carried out applying three knowledge philosophical orientations suggested by Easton (1995); positivism, realism and constructivism, which will be described briefly in the following. I should, however, bear in mind that neither of these dominates all other orientations on philosophical arguments alone. The positivist-position and the constructivist-position are related to two opposite extreme epistemological positions and will be discussed together with a third position, realism.

1. Positivism

The true positivist considers only those knowledge claims that are based directly on empirical observations as scientifically meaningful. The theory is reduced and restricted to include descriptions and summaries of observed phenomena and relations. This implies that the area of applicability for the theory is reduced with no value outside the area of empirical observations. With respect to the researcher's role it is restricted to a passive, unresisting monitor of the reality. Classical positivist thinking holds that the researcher can be an objective observer who collects facts about the subject at hand, and has no influence upon the subject under scrutiny. Subjectivity and assessment by the researcher in interaction with the research object to reveal attitudes, intentions, motives and learning is therefore not recognized as part of the research area. Opponents argue that a large number of interesting phenomena are unobservable realities, for example physical phenomena such as electricity, and psychological phenomena such as learning and adaptations. The inspiration from the hypothetical-deductive archetype is fairly evident.

By failing to recognize the role of human behavior, motives and learning in the research setting, this implies problems in understanding phenomena such as interorganizational conflict. Complex contexts and phenomena can challenge the positivist where the human nature is a basic variable. How can I understand different perceptions of causes of conflict in interorganizational relationships without considering the variety of interpersonal attitudes, motives and expectations? How can I understand complex interrelated attitudes and expectations expressed by an ambiguous language? A positivist

approach to understand social phenomena in general and more specifically inter-organizational studies of conflict do seem restrictive and difficult to make valid knowledge claims. At the same time I should bear in mind that the anti-positivist may well be accused of not extracting the most important elements, thus accepting too many insignificant elements in the study on the expense of low explanatory power and generality.

The important implication of this is to execute consciousness and awareness in relying on statistical variable analysis in exploring the sources to conflict in complex projects, mainly because of the risk of oversimplification.

2. Constructivism

The constructivist assumes that "truth" is a social construct. Constructivism, in its extreme, claims that the world is created by the mind of the individual. This implies that sense data is considered ambiguous and highly questionable. Reality is constructed in a process starting from a pre-existing view of the world, which influence data to collect, which are then interpreted. A consequence of this view is that the criteria I use to judge models of the world are highly socially influenced, which makes it problematic to find a general way of making knowledge claims.

An important argument for supporting the constructivist way of thinking is provided by the fact that I understand the world through language. Language is considered as a social construct consisting of common terms with different meanings in different contexts. Different visions and understanding of attitudes, cultures etc. are thus created by using different languages. Our knowledge structures are in this respect linguistic conventions. The opponents of constructivism argue that the individual behaves as if there is a reality separated and distinct from our perceptions of it, referring to a long range of regularities in human behavior. (E.g. Changes in product price cause effect on the consumer demand).

Is it possible to understand sources to conflict in projects without accepting the different realities constructed by the actors involved? Furthermore, is it possible to isolate the researcher from the individual parties' perceptions of the conflict being studied, or is the insight into the phenomenon contingent upon interaction with the researcher? I believe that in sensitive social phenomena, such as conflict, the researcher cannot act in isolation from the phenomenon as claimed by the positivists. As a consequence a scientific study cannot be quite neutral, thus implying that knowledge is a social construction. I therefore support some of the basic axioms within constructivism. On the other hand, the phenomenon related to economic exchanges cannot be seen solely as a social construct like a social

community, as I know that business partners also act upon economic and technological realities.

One important implication of this is that an uncritical qualitative case study approach may give virtually no generality claims, and low validity.

3. Realism

Realism is a third School of thought where the supporters believe there exists a "reality out there" which can be discovered and ultimately understood. According to Troye (1994) it can be argued that objects have an existence independent from our knowledge and the terms I apply. The main issue is then how to find that world. Theories based upon a realism position are considered "richer" than the empirical data that is applied for testing the theory.

The position is distinct from the positivist tradition as well as the constructivist position, but have some similarities. The crucial point is the recognition of an objective reality, a reality that may be more or less discovered by the researcher. "We see through the dark glass darkly but there is something there to be seen" (Easton 1995:373). Different researchers will, however, run the risk of disclosing the "reality" differently. The assumption of one "reality" corresponds with the positivistic position, but differs in rejecting the importance of causality (Easton 1995). The realist position emphasizes on the other hand the processual part of the phenomenon with focus on discovering and explaining the complexity in related variables. The firm and its related counterparts are thus not primarily a constructed phenomenon, but have a "true reality". Acknowledging its focus on the complexity and processual aspects of "reality" leads us into the realist position in understanding conflict in complex projects.

4.2.3 Summing up on epistemological position

The purpose of this discussion is to develop consciousness in claiming knowledge rather than making distinctive epistemological choices. Practical research requires flexibility in choice of methodology, which can imply a deviation from the adopted epistemological position. With this in mind I hold realism as a fruitful epistemological position thus recognizing elements from the archetypes of hypothetical-deductive method and hermeneutics. For a further epistemological comparison in relation to phenomenon and theory, see appendix 2.1-2.3.

Whereas the research procedure for a qualitative study is flexible and iterative, the quantitative variable analysis is more stringent: It starts with setting up a theory, then drawing representative samples and generating data based on objective criterion, and finally testing the hypotheses about partial relationships.

The differences between the archetypes do not only exist at the methodological level. Their epistemological and philosophical underpinnings are also different. This doesn't necessarily imply that these are contradictory. Several classical as well as contemporary scholars argue that the different positions represent varying degrees of fruitfulness in relation to the phenomenon being studied. One consequence of this view is that tradition of academic institutions or scientific journals can "force" us into a specific orientation, not necessarily fruitful for the phenomenon being studied.

Summing up, I argue that two different methodologies can be combined because the phenomenon can be understood from several angles, and from different positions. The crucial point is openness in methodological choices and assumptions. On the other hand, however, one should apply consciousness regarding epistemological and philosophical underpinnings for the research methods applied.

4.3 Complementary or mutually exclusive ways to knowledge?

One practical question emerges from the discussion of epistemological and methodological positions. How can I combine a qualitative study with a quantitative variable analysis?

Some scholars argue that certain methods applied in generating knowledge are inappropriate either for a specific phenomenon, or in general thus labeling the method "unscientific". Others are more pragmatically orientated. Some disciplines within studies of economic exchange, such as e.g. consumer marketing have a strong research tradition favoring quantitative approaches based upon statistical treatment of numerical variables. In some academic journals it may even be close to impossible to be accepted with an untraditional research approach. Other disciplines, e.g. organizational science would favor extensive use of language conventions materialized through a qualitative study.

The most interesting, however, is that different scholars can benefit from alternative approaches in search for a deeper understanding of how and why

things happen. Some even argue that more than one method should be used to ensure validity, because this produces a more complete and contextual portrait of the object under study than one method (Campbell and Fiske 1959). This has led to "two-step studies" where a qualitative case study has been applied to build hypotheses and propositions in the first place, followed by a quantitative variable analysis for testing the hypotheses. Others start with a statistical based variable analysis as an ingredient to qualitative case study. Following this it is hard to claim that there are only mutually exclusive ways to knowledge. In order to further build arguments for this view I have to recognize and understand some of the fundamental differences between the methodological archetypes.

4.4 The choice of methodology

The choices to be made in research methodology are defined by the epistemological choice and the phenomenon formulated in the research question (Muncy and Fisk 1987). The network theory will be added to this discussion, because epistemology, the phenomenon and the theory are interrelated, acknowledging the potential problem that certain theories might not fit with methodology or with the epistemological fundament, or vice versa.

Methodology is a complete specification of all the decisions needed to be taken in order to carry out a research project. In order to proceed into choice of methodological matters I need to identify the distinct methodologies available. One way is to follow taxonomy referring to axiology, context, level of communication, sample and time (Easton 1995). A taxonomic hierarchy assumes that a position in one dimension determines the next, indicating that there is only one unique structure. An alternative view is to allow any combination of positions and hence view the particular position as independent. The taxonomy provided by Easton (1995) is a combination of the two views.

Suggested degree of coherence between methodology alternatives and the network theory, and phenomenon, respectively, is presented as a matrix in appendix 2.2 to 2.4. The methodological decisions are organized around 5 levels; the axiology level, context level, communication level, sample level and time level.

On the axiology level two main groups of studies are of particular interest, descriptive research and the exploratory study.

In descriptive research, the problem is structured and well understood. Key characteristics of descriptive research are structure and precise rules and procedures (Ghauri 1995). A good descriptive study presupposes considerable prior knowledge about the phenomenon to be studied, and rests on one or more specific hypotheses. Whereas an exploratory study is characterized by its flexibility, descriptive studies can be considered more rigidly. I do not know very much about the phenomenon of conflict in a project context prior to start, I have no clear hypothesis, and envisage that understanding the phenomenon and elaborating hypotheses will be easier during the data collecting and analysis phase.

When the research problem is badly understood, an exploratory research design is adequate (Ghauri 1995). The general objective in exploratory research is to gain insights and ideas, and is accordingly helpful in breaking broad, vague problem statements into smaller, more precise sub problem statements, hopefully in the form of specific hypotheses (Churchill 1987). A crucial question is how well the research question is structured and understood prior to the investigation. In complex social phenomena with new pieces of information emerging in the research process, methodological flexibility is warranted. An another aspect supporting this view pertains to the complexity of a network, and the problem of how to draw the boundaries. Given the fact that a network in principle is borderless, no study can without unrealistic resources grasp a phenomenon where all elements are important and interdependent. An exploratory study will thus allow flexibility in drawing those boundaries for the analysis during the research process. On the other hand, even in a network perspective, one can focus on dyadic relations and reduce the need for flexibility.

Summing up, I argue that lack of prior studies of interorganizational conflict in a context of projects characterized by great complexity, and use of the industrial network theory, call for methodological flexibility. This flexibility is provided by the explorative study.

Whereas axiology-level was discussed for the study as a whole, the remaining four levels will be discussed specifically for each of the two basic questions within the frame of an exploratory study.

The purpose of the next two chapters, chapter 4.5 and 4.6, is to lay the fundament for the methodological approach for the two basic research questions. The theoretical positions of which the questions are derived will be taken up in chapter 5.

4.5 Methodology for answering the first basic research question

The first question is:

When informants from buyer (representing the project owners) and seller side assess events of conflict, to what extent do they associate conflict with formal- versus informal governance mechanisms?

4.5.1 Context level

Can the phenomenon be studied usefully outside its natural setting or not? In order to assess the importance of context the following question should be answered: Will the phenomenon "behave naturally" out of context? An answer on the research question requires an understanding of the context from which the episodes are derived. Some episodes may be sound generic, e.g. "a construction error caused 2 days of delay". The consequences and implications importance of a conflict like this, however, dependent upon characteristics of the project. A study of events of conflict derived from a mix of any project will cause significant validity challenges. I therefore conclude that the question should be based on a "in-context" setting by extracting episodes from selected fabrication projects from the oil industry.

4.5.2 Communication-level

The dimension of involvement with the informants underlies this level of classification. A high involvement means higher currency but lower data integrity. Data integrity may be disrupted because our dependency upon the informants' willingness and ability to respond. By using a low involvement approach I run the risk of obtaining incorrect or marginal data.

The research question contains two elements. Whereas the first is related to the way episodes of conflict should be identified and described, the second is related to the assessment of the episodes in relation to the governance-mechanisms.

The identification and description of episodes is not primarily a perceptual issue, and could follow a low involvement approach. Through archival research data can be collected from records and documents, and contingent upon existence and access, provide insight into events of interest. The challenge is to gain full access and practical support, and cope with the risk

of missing undocumented information. For the identification of events a low communicative approach in terms of an archival study is fruitful.

The assessment, however, requires deeper involvement since it is based on perceptions. The analysis of these perceptions could either follow a qualitative or a quantitative approach.

The assessment of events in terms of association to the two groups of governance is well suited for quantitative analysis of at least three reasons. Firstly, because the question consists of few variables that are easy to specify and model. Secondly, a large number of events and informants are available. This provides large samples necessary to claim validity. Thirdly, events identified in selected projects are also found in other projects. This improves statistical representativeness and enhances generality. A quantitative approach, with high informant involvement, is therefore highly desired.

4.5.3 Sample-level

In order to obtain relevant data three major challenges emerge. How should the population be defined? How should representativeness be secured? What sample size is needed? (Frankfort-Nachmias and Nachmias 1996). The sampling issue will be further discussed in chapter 8.

4.5.4 Time-level

The study can be carried out in a contemporary setting or in a longitudinal time perspective where the data collected refers to different points in time. The last group includes event-sampling studies. If regular studies of response units over time do not capture the crucial data this might be the proper method. The idea is to follow events of major significance over time, and requires continuous monitoring of important events. The criteria for selection of these events are crucial. It is most likely that different events of conflict do occur in an irregular pattern. As a result of a possible irregular pattern I believe that the episodes of conflict should be identified through event sampling methodology.

4.6 Methodology for answering the second basic research question

The second basic research question is:

If conflict is primarily associated with formal (or informal) governance mechanisms, what are the main threats to improvement of the formal- (or informal) governance mechanisms?

4.6.1 Context level

The question is based on the result from the preceding analysis, which was regarded as a contextual study. Searching for elements threatening the most important mechanism should therefore follow the same context. The context could, however, be extended to complex project in the oil industry, and not necessarily the specific projects from which the events were extracted. This implies that informants applied in answering this question can be recruited more freely without focusing the identity of the projects the results have been based on.

4.6.2 Communication-level

Compared to the first research question this belongs to the subjectivistic position on the epistemological scale. I do not seek causal explanations but "meaning", and the meaning is expressed from language and symbols per se. A question requiring in-depth insight is most suitable for qualitative methods (Ghauri 1995).

Van Maanen (1983) offers two distinguishing features with the qualitative study. Firstly, the distance between the researcher and the individual should be small in order to create meaning. Secondly, the descriptions are time- and place bound and cannot be generalized without great awareness and interpretation skills, because meaning only exists in context. Thus the crucial issue is what status the researcher's interpretation should have. The subjective "insider view" and closeness to data, the explorative orientation, process orientation and holistic perspective are important characteristics of the qualitative approach. Generalization made by comparison of properties and context of individual organism is the least, but not less important aspect characterizing the qualitative method.

Summing up I find a qualitative methodology most relevant for exploring my second research question, thus recognizing two types of risk. Firstly, the

risk of unbalance in the closeness/distance consideration between researchers and informants' interpretation. Secondly, that the two research questions follows two opposite scientific philosophical orientations in terms of objectivistic- and subjectivistic positions.

4.6.3 Sample-level

The most relevant issue here is the representativeness of informants involved in scrutinizing the weaknesses of the most dominating governance mechanism. I have three major concerns. The first is to involve informants with contextual knowledge, primarily based on experience with conflict between buyers and sellers in complex fabrication projects in the Norwegian oil industry. Thus complies with my "in-context" assumption. The second concern is that the informants should have a distance to the projects of which the first question is based to improve generality. The third concern is that the informants should possess diversity in professional and cultural background, and include experience from buyer's side and seller's sides. This will improve the ability to explore a wide range of elements necessary for answering the question.

4.6.4 Time-level

Based on the findings related to the first research question I want to identify the sources to weaknesses or threats in general. A contemporary setting is therefore found most relevant. This implies that the analysis will be based on the informants' interpretation of the phenomenon in general, regardless of the time frame applied in the first research question.

4.7 Concluding on epistemology and methodology

The preceding discussion can be narrowed down to the following two conclusions: Firstly, the two basic research questions require two different methodologies. The first question is based on an archival study for identifying episodes of conflict, and a quantitative study for scrutinizing the role of the two governance mechanisms. The second question is based on a qualitative study.

Secondly, the choice of methodology reflects our understanding of contextual characteristics, the phenomenon and to some extent the theory being applied. (For a more comprehensive outline see appendix 2.2-2.4) The

two methodologies are based upon different, and to some extent contradicting, scientific ideals: an objectivistic view influenced by the hypothetical-deductive method for the first question, and a subjectivistic view influenced by hermeneutics. I argued that there is no cardinal problem in accepting these two positions.

The bearing of the methodological discussion above will be further elaborated in conceptual model and in research design (chapter 6 and 8 for stage one, and chapter 12 for stage two). This includes a detailed account of empirical consequences of the methodological choices.

5. The research questions

This chapter discusses the two basic research questions set forth in chapter 4, and elaborates these into more detailed questions. The two questions represent two stages of the study. In the first stage the first basic research question are answered by applying a variable analysis. The second stage is based on a qualitative methodology in answering the second basic research question.

The first basic question (stage one) is:

When informants from the buyer's and the seller's side assess events of conflict in complex projects, to what extent do they associate conflict with formal versus informal governance mechanisms?

In the following this question will be split into six sub questions. The first is related to the importance of the two governance mechanisms in relation to the conflict events. In the second question the relationship between perceived importance of conflict event and the governance mechanisms is investigated. The third, fourth, and fifth question address the relationship between the governance mechanisms and different structural characteristics of the events. These characteristics include type of interdependence, third party interference, hierarchical level, and cultural distance.

The second basic question (stage two) is:

If conflict in complex projects is primarily associated with formal (or informal) governance mechanisms, what are the main threats to the most distinctive governance mechanism?

This question will, depending on the finding in first stage, either be related to formal- or informal governance mechanisms.

5.1 Stage one, research questions

The research questions pertaining to stage one is based on an understanding of formal and informal governance mechanisms. An introduction to these mechanisms was carried out in chapter 2.7, and is continued in the following. A more comprehensive and detailed discussion of informal and formal governance mechanisms is outlined in chapter 6.8.

5.1.1 Perceived importance of formal versus informal governance mechanisms when facing conflict

Both the seller and buyer informants are supposed to allocate selected conflict events in relation to formal and informal governance mechanisms. This assessment will be based on the assumption that defectiveness in the governance mechanisms causes the emergence of conflict events. If a specific event is given 5 on the 5-point scale this means that the informant claims weaknesses in the formal mechanism. One further implication of this is that the mechanism is found important and should be improved.

Here is a possible weak point of logic. If an event is caused by weaknesses in, for example, formal mechanism, why is this an indication of formal importance and not the opposite? It is thus possible that an event associated with lack of precision in contracts and specifications etc. really emphasizes the importance of the "opposite" informal and soft relational mechanisms. In other words, defectiveness in formal mechanisms can indicate importance of informal mechanisms.

I believe there is a possibility that some of the events associated with weaknesses in one mechanism cannot be improved, and that improvement of the "opposite" mechanism therefore is the only solution. In the practical world, however, I believe that if an event is given e.g. 5 on the scale, it is an indicator of three characteristics. Firstly, defectiveness in the formal governance mechanism, secondly, the importance of formal mechanism, and thirdly, that formal mechanisms should be improved in order to improve the interaction. In order to reduce this risk of misunderstanding, informants were advised about this assumption prior to start-up of the assessments.

The expected finding is unclear, which prevents us from suggesting clear hypotheses. This emphasizes the explorative character of this study. No previous studies of this phenomenon in projects have been found. Preliminary discussions with managers and project officers in oil industry do not provide unambiguous standpoints. On the other hand, we know that the oil industry in general places a premium on planning and development of routines and standard operation procedures; in other words; formal governance mechanisms.

This leads to the following formulation:

Q1.1. When events of conflict are identified in complex projects, to what extent are these related to formal governance mechanisms from the buyer's- and seller's point of view?

In this study I have three different cases in the empirical material. Two projects, facing different managerial- and technological challenges, and one non-project. The following two questions are related to possible differences between the three cases:

Q1.2. To what extent do the project findings differ with regards to the type of project challenges?

Q1.3 When events of conflict are analyzed the same way in a non-project context, to what extent do findings support the findings in a complex project context?

5.1.2 Relation between perceived conflict importance and the governance mechanisms

I expect to find a high degree of formalism when the events are considered important, since I assume that formal mechanisms are designed for the purpose of guiding important events into goal fulfillment. Oil companies spend large resources on formal governance mechanisms. These investments and costs are a protection against important problems the occurrence of which are anticipated in the dyad. Hence I expect to find a positive correlation between perceived event importance and formal governance mechanism. Furthermore, I expect no significant difference across the three cases.

Accordingly I suggest the following two research questions:

Q2.1. Based upon the seller's perception of the importance of event, how does this relate to the perception of governance from seller's side?

Q2.2. Based upon the buyer's perception of the importance of the event, how does this relate to the perception of governance from the buyer's side?

5.1.3 Relation between third party interference and the governance mechanisms

Contracts and the like are bilateral and designed to govern interaction between buyer and seller. At the same time third parties exist, and play a role in the dyad (see chapter 3). As regards the perception of the governance mechanisms, two possible explanations of conflict events emerge. Firstly, conflict events involving third parties implies weaknesses in formal mechanisms, because the protection of organized and planned interaction is disturbed. An active and influent third party interfering with the buyer-seller dyad reduces the power of contract and other established rules and procedures between the dyadic parties. The second alternative is a perceived lack of the informal governance, simply because seller and buyer know that informal interaction is crucial when base organizations, governmental bodies etc. enter the scene. In other words, as long as no contract or regulation can handle third parties, conflict will be a result of weak informal governance mechanisms. Summing up, I have no clear hypothesis in the relationship between third party influence and the governance issue.

The research question is formulated as:

Q3. How does the existence of third parties involved in the buyer-seller dyad relate to the perception of the governance mechanisms?

5.1.4 Relation between type of event interdependence and the governance mechanisms

The project is webbed into three types of interdependencies as concluded in chapter 3. To what extent do these relate to the perception of governance mechanisms? Some events relate to the way resources are handled and connected to other types of resources. Buyers can control resources of crucial importance for the seller's ability to utilize theirs. An interesting question is whether conflict in these types of events are perceived differently than those related to i.e. activity interfaces when it comes to the governance issue. An answer can firstly, improve my understanding of the interdependency-construct in the network theory, and secondly reveal the area where the importance of the two governance mechanisms differs.

This leads to the following research question:

Q4. The industrial network approach set forth three types of interdependencies in a relationship. How does these types differ in relation to formal and informal governance mechanisms?

5.1.5 Relation between the hierarchical level and the governance mechanisms

To what degree can differences between day-to-day operational conflict events and more strategic events be related to the governance issue? One can argue that an event associated with strategic issues (highest hierarchical level) is expected to have a tendency towards formal mechanisms simply because strategies are formalized. On the other hand, a strategic conflict event can be associated with strategic implications, which can be related to more informal judgement. The answer is open, and adds to the list of questions for further investigation.

The research question is formulated as:

Q5. The conflict events are formed into groups characterizing association to strategic- administrative and operational level. How does these types differ in relation to formal and informal governance mechanisms?

5.1.6 Relation between cultural distance and the governance mechanisms

Informants on the buyer side were all Norwegians. On the seller side, informants from South Korea, Japan and Norway are included. This opens for a comparison of governance perceptions across nations and cultures. It has been claimed that Asians have less formal and more relational cultural business attitudes than Norwegians, but I do not know this for sure. This will be further explored in the final question expressed as:

Q6. What role does cultural distance play in relation to the governance mechanisms?

The first basic research question is split into nine sub questions for further investigation. These are summarized in the following table.

Table 5.1 Research questions for stage one -Overview

Research questions, stage one:	
Q1	How do the buyer and seller perceive the governance mechanisms in relation to conflict events?
Q1.1	When events of conflict are identified in complex projects, to what extent are these related to formal governance mechanisms from the buyer's- and seller's point of view?
Q1.2	To what extent do the project findings differ with regards to the type of project challenges?
Q1.3	When events of conflict are analyzed the same way in a non-project context , to what extent do findings support the findings in a complex project context?
Q2	How do the perceptions of buyer and seller as to the importance of the event relate to the parties' perception of the governance mechanisms?
Q2.1	Based upon the seller's perception of the importance of event, how does this relate to the perception of governance from seller's side?
Q2.2	Based upon the buyer's perception of the importance of the event, how does this relate to the perception of governance from the buyer's side?
Q3	How does the existence of third parties involved in the buyer-seller dyad relate to the perception of the governance mechanisms?
Q4	The industrial network approach set forth three types of interdependencies in a relationship. How does these types differ in relation to formal and informal governance mechanisms?
Q5	The conflict events are formed into groups characterizing association to strategic- administrative and operational level. How does these types differ in relation to formal and informal governance mechanisms?
Q6	What role does cultural distance play in relation to the governance mechanisms?

5.2 Stage two, research question

5.2.1 Threats to the most distinctive governance mechanism

The answer to the previous research questions concludes that conflict is primarily a result of weaknesses in the governance mechanisms. In this final research question the dominant governance mechanism is scrutinized with respect to these weaknesses. Unlike the other questions the methodology is qualitative instead of the quantitative variable analysis applied for the other. Hence I improve the study by in-depth interviews with opportunities for disclosing deeper aspects of conflict than in the former.

Table 5.2 Research question for stage two

Research question, stage two:	
Q7	Based on the findings in the first stage of the study we know whether conflict is primarily associated with informal or formal governance mechanisms. Focusing on the most distinctive of the two governance mechanisms, what are the major threats to this?

This question is important because it opens for identification of elements among the actors, in the business atmosphere or in the industrial network threatening the governance mechanism associated with the origin to conflict.

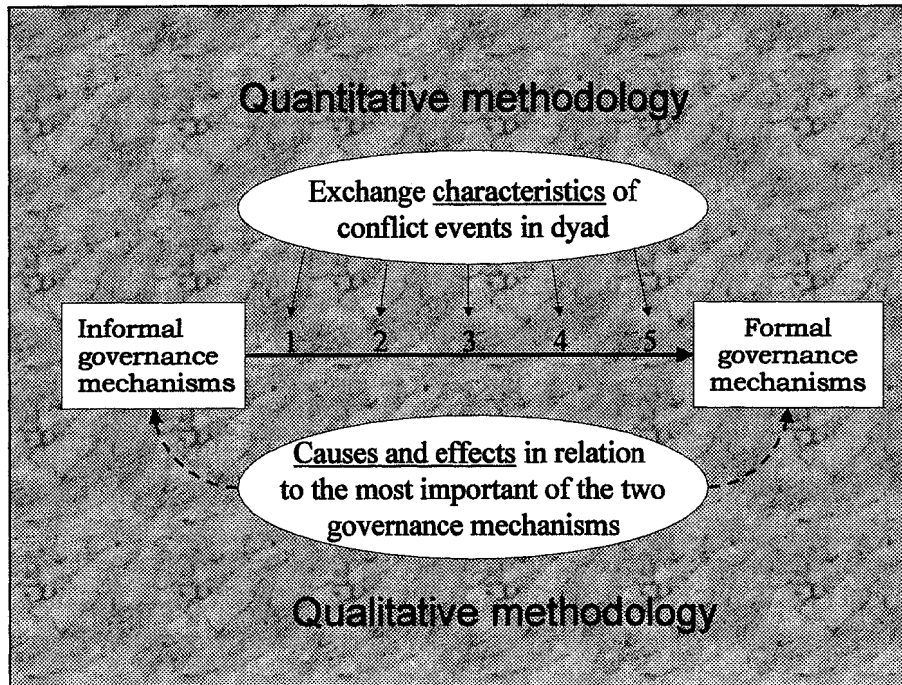
5.3 Two basic questions, two methodologies, two stages

The study consists of two stages that to some extent represent different aspects of the phenomenon of conflict. The first is a static study of the exchange characteristics of the conflict events in relation to the two sets of governance mechanisms. Data is coded for statistical treatment. In this part my emphasis is on structural aspects between conflict and the two modes of governance. Referring to my previous discussion in chapter 4.4, a structural analysis employing a variable analysis has weaknesses in depth and comprehensiveness which are particular relevant when I want to find out why deficits in governance mechanisms cause conflict. This challenge is therefore taken up in the second stage of the study.

The second part is a qualitative study for exploring the threats related to the most important mechanisms revealed in the first part of the study. The findings in stage one are used as a starting point for a discussion with a new set of informants in order to further enhance my understanding of processual aspects of the phenomenon.

The methodologies in relation to the governance mechanisms and events are illustrated in the following:

Figure 5.1 Two stages, two methodologies



PART 2, DESIGN AND ANALYSIS STAGE 1

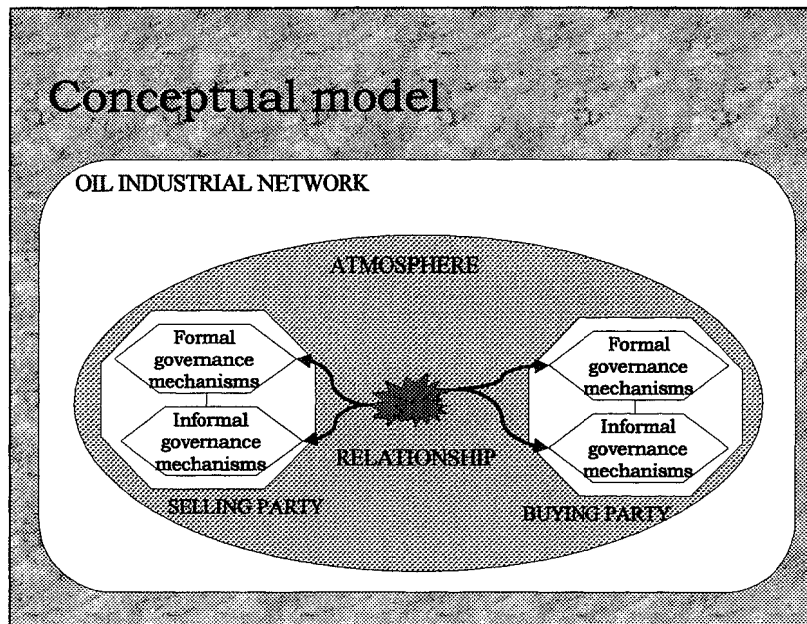
6. Conceptual model

6.1 The conceptual model

My conceptual model is based on the interaction model (Håkansson 1982), where business-to-business interaction is characterized through the relations and characteristics of four elements. These elements consist of the parties, the interaction between the parties, the atmosphere embracing the interaction, and the environment embracing the atmosphere.

In my model the events of conflict occur in a business relationship. Compared to the interaction model I apply the relationship-construct rather than interaction. The way events of conflict are interpreted by the parties reveals interesting aspects of the business relationship. This interpretation is carried out applying formal- and informal governance mechanisms.

Figure 6.1 Conceptual model



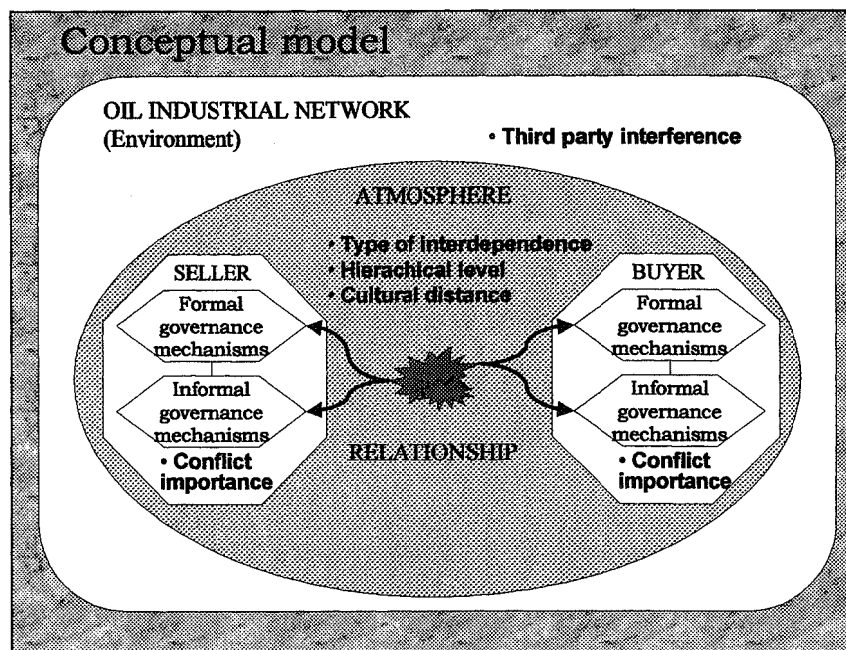
Derived from Håkansson (1982)

Several elements have an effect on how these events are interpreted. Firstly, characteristics with the parties play a role. Secondly, the business

atmosphere between the project team (buyer side) and the contractor (seller side) plays a role. Thirdly, the environment I have labeled "the oil industrial network" has a role towards the atmosphere, and further in relation to the actors. These relations are conceptualized in the model illustrated above.

The constructs applied in research questions are related to the selling- and buying parties, the atmosphere and the oil industrial network. As illustrated below the parties assess the conflict events in relation to association to the two governance mechanisms, and to the perceived importance of the events. Factors in the atmosphere in relation to the events are formulated through type of interdependencies, cultural distance, and finally through hierarchical level. Environmental factors, found in the oil industrial network, are formulated through third party interference with the conflict event. The factors' fit into the conceptual framework is illustrated in the following:

Figure 6.2 Conceptual model and elements of interest



In the following the conceptual model is further elaborated into the research model.

6.2 Research model

First the importance of the two governance mechanisms in relation to the conflict events is estimated. The findings are thereafter tested against four structural variables, and one perceptual variable, characterizing the events. Each of the constructs applied is discussed in the following:

The mode of governance connected to the conflict events is the basis for the dependent variables of the study. These are assumed to be influenced by a range of characteristics related to the conflict event. From prior discussion in chapter 3 I believe that interdependencies in terms of activity-, resource and actor interdependencies, including extent of third party interference in the focal dyad, may impact on how the governance issue is perceived. These are expressed in terms of two independent variables.

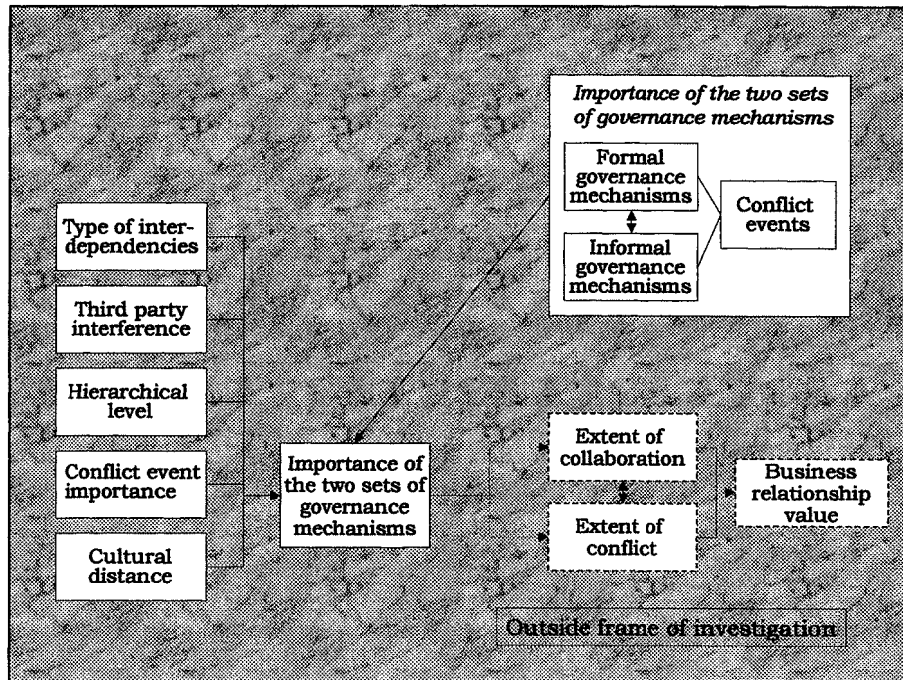
The third variable is related to the hierarchical level of the conflict event, and expresses a possible perceptual difference between events on the operational-, administrative-, and strategic level in relation to the governance issue.

I further believe that different perceptions of event importance may be related to the governance mechanisms. Events are gathered from experience reports and interviews, representing different degrees of importance ranging from minor incidents to situations causing large project delays. A test of a possible relationship may answer the question as to which governance mechanism the most important events are related. If e.g. the most important events are related to lack of informal mechanisms, this will question the value of planning, and perhaps redistribute resources from planning to trust-building investments.

The final independent variable in my model is related to the fact that the informant groups assessing the events from seller side are recruited from Japan, South Korea and Norway. Acknowledging a large stream of marketing research dealing with cultural differences, I want to explore the differences between the Asian- and Norwegian perception of the governance issue.

This leads us to the following research model:

Figure 6.3. Research model



Knowledge claimed from the study of event characteristics in relation to governance mechanisms gives a new opportunity to understand the interplay between conflict and collaboration discussed in chapter 2.3. According to Gadde and Håkansson (1993) a high degree of collaboration and conflict is one condition for a well-developed business relationship. For example, if the seller and buyer side have quite different perceptions of whether the events are caused by deficits in formal governance mechanisms or not, I can assume that the extent of collaboration is low compared with the extent of conflict. This has consequences for the value of the existing business relationship. An empirical example is found in the ongoing (by June 2001) legal battle between Esso/Exxon versus the Smedvig-group regarding a production vessel, where a strong formal and legal focused corporate culture challenges a more informal way of handling business. Here the business relationship is broken, possibly as a result of an uneven mix of conflict and collaboration.

The model is based upon one important assumption related to the two main constructs, the conflict event and the governance mechanisms. These are assumed as being perceptual in the sense that the buyer- and seller sides have different imaginations or pictures of the conflict events and the

governance mechanisms. Differences in past experience and history thus have an effect on how these events are perceived. Hence the two constructs are not considered as neutral constructs as claimed by the pure positivist, rather as social constructs as claimed by the realist School of thought, as discussed in chapter 4.2. This implies that whereas the selling party may perceive one event as a minor isolated incident miles away from a conflict, the buyer side may consider the "same" event as a highly inflammable conflict issue, simply because their past experiences are different.

In the following each of the five independent variables and the single dependent variable are elaborated and operationalized. In developing measures of constructs the procedure suggested by Churchill (1979) has been applied: Firstly, the domain of construct was specified with basis in literature search as discussed in chapter 2 and 3. Secondly, items were generated from previous research with some modifications.

6.3 Type of interdependencies

Activity-, actor- and resource interdependencies were discussed in chapter 3 as main components in the industrial network approach. Type of interdependencies is characterized as a structural construct rather than a perceptual one and refers to characteristics of the event. Great complexity calls for improvisation and flexibility because predefined patterns of behavior might be, or assumed to be inapplicable to specific situations. This might be based on e.g. bounded rationality or bounded knowledge. From a theoretical point of view complexity is addressed in the network approach in terms of different types of interdependencies and the notion of arbitrary boundaries.

Operationalization:

The network approach rests on the assumptions of dependencies among and between actors (Håkansson and Snehota 1995). Types of interdependencies represent various degree of complexity. In a project the activity interdependencies are extremely complex compared to the other dimensions. This variable is labeled DEPCAT.

Table 6.1 Content of the DEPCAT variable

DEPCAT-variable	Operational definitions
1. Actor interdependencies	Actor bonds with the person he/she is interacting. The bonds influence on how the two actors perceive each other and form their identities in relation to each other.
2. Resource interdependencies	Resource ties connect various resource elements (technological, material, knowledge resources and other intangibles) of buyer and seller. The ties result from how the relationship has developed and represents in itself a resource for the company
3. Activity interdependencies	Activity links are related to the technical, administrative, commercial and other activities of a company. These can be connected in different ways to those of another company as a relationship develops.

6.4 Third party interference

This variable is closely related to the actor interdependency referred to above. Third party roles are addressed by e.g. Håkansson and Snehota (1995) as indirect relationships having effect and being affected by focal buyer-seller dyad. This was discussed in chapter 3.2 and 3.5.

Third parties involved in the dyad represent complexity because more actors have to be considered in the decision process. Hence the variable proposed, labeled 3PRTY, reflects network complexity in terms of third party involvement in the specific event.

Operationalization:

The variable is based on interpretation of whether other actors than buyer and seller are active in the dyad. The classification process involves buyer-side informants and researcher and is further described in chapter 8.

Table 6.2 Content of the 3PRTY variable

3PRTY-variable	Operational definitions
1. Yes	Internal- and/or external 3 rd parties are active in the dyad
2. No	No 3 rd parties are active in the dyad

6.5 Hierarchical level

This is also considered as a structural issue rather than a perceptual one. The construct embraces the organizational hierarchy of which the event is a part. Classification of hierarchical level (LEVEL-variable) refers to the generic construct of strategic-, administrative-, and operational levels included in corporate strategy literature.

Operationalization:

The variable is labeled LEVEL and refers to the hierarchical level of which the event is associated. This is further illustrated in the following table:

Table 6.3 Content of the LEVEL variable

LEVEL-variable	Operational definitions
1. Strategic level	The event is classified as a strategic issue. Project strategy, contract philosophy, long term business relations are elements.
2. Administrative level	The event is classified to the intermediate level in the managerial hierarchy. This includes general project administration issues.
3. Operational level	The event is classified to operational level including day to day challenges and functional areas.

6.6 The importance of conflict events

This is considered as mainly a perceptual issue. Some of the events are considered marginal, others have a strong effect on the main goal. This raises two important questions. First, against what standard or criteria should importance of the event be measured? Recognizing that a conflict event is a deviation from a standard or expectation, what standard/expectation should apply as reference points? Liljander and Strandvik (1995) suggest ideal standards, relationship norms, industry standards and predictive expectations.

The problem in projects is the lack of clear standards or expectations. Whereas a continuous value chain, such as base operations, is concerned with the management of a recurrent flow of known activities and materials, a complex fabrication-project comprises organizational and technological innovations and diversity. It is thus not easy to define clear comparison standards in a "prototype"-project. Hence I have left the criteria for

importance open for the informants to decide. The applied comparison standard may thus be based on expectations of high project progress, low cost, or other criteria of importance perceived by the informant.

The second question is connected to which extent the event importance can be assessed without relating the event to the chain of events of which it is a part. This is further related to a discussion of conflict embeddedness, discussed in chapter 2. Hence a partial assessment of event importance has to be constrained. On the other hand, even business relations are more or less built up of events. A partial analysis is therefore fruitful. Furthermore, no one is able to fully envision the accumulated effect of partial events either with respect to the embedded effect (e.g. business relations) or with respect to sequential effects (e.g. effect on succeeding events and activities in the value chain).

Operationalization:

Importance of the event is measured through the variable CRIT (Criticality) which reflects the perceived importance of the event in relation to the articulated goal of the projects. The CRIT-variable is labeled SCRIT for the seller's perception of the importance, and BCRIT for the buyer's perception of the same. The informants have placed the events on a scale from 1 (low importance) to 5 (high importance).

Structure of measurements

Some constructs are abstract and comprise elements that sometimes require multiple indicators, each reflecting a distinct aspect of the concept involved. By applying multiple measures, internal consistency can be validity tested in terms of multi-trait methods or factor analysis. The question is whether the conflict event importance is a theoretical construct requiring creation of more empirical, observable indicators, or the construct can be applied directly. These are referred to as reflective- and formative measurements (Frankfort-Nachmias 1996)

Importance of a conflict event is hard to assess objectively because the construct covers a variety of aspects related to the consequences in a project. An event can be important because it causes delay in project progress, the event may cause unanticipated cost escalation, quality errors or functionality problems. This implies that the individual informant may have different standard and measures in considering the importance of event. The construct therefore has weaknesses, which could be improved by measuring sets of indicators related to the overall importance of a conflict event.

On the other hand several measurements for event importance may lead to even more inconsistency in the way that the indicators of the construct represent contradictory aspects in relation to the empirical- and theoretical world. Hence different indicators of importance may not necessarily express the totality of the construct. A further argument is that the composite construct is an expression of overall importance, which is considered a generic construct grounded both in the theoretical- and in the empirical world. Hence, a compound measure was chosen, mainly because the risk is higher for confusion and loss of validity by dividing up the construct and use of proxies, than applying a compound construct.

6.7 Cultural distance

In international marketing literature, cultural distance is a common term, which reflects an array of differences across e.g. nations. These can be reflected in the business interaction and in the characteristics of the parties such as language and personal rules of conduct.

The nationality and home country of the seller side informants is categorized in terms of two groups, Norway and South Korea/Japan.

Table 6.4 Content of the CULTURE variable

CULTURE-variable	Operational definitions
1. Norway	Norwegian seller perceptions of the governance mechanisms in dyad 2 and 3 in Norne-project
2. Korea/Japan	Joint South Korean and Japanese seller perceptions of the governance mechanisms in Norne-project

6.8 Governance of conflict

This is the dependent variable in the conceptual model. The following description of the construct is based on my discussion of sources to conflict in chapter 2.7.

6.8.1 Introduction

Governance mechanisms are discussed in several empirical studies within buyer-seller relations, which apply different theoretical and methodological traditions. Some are dyadic studies, e.g. Heide and John (1992), others are industrial network studies e.g. Håkansson and Snehota (1995). The

governance issue can be broken down and operationalized into at least three aspects, degree of formalization, degree of flexibility and degree of mutuality characterizing the business relation (Heide 1987). The degree of formalization describes e.g. the extent to which fixed rules and standard operation procedures govern the execution of the exchange activities (Heide 1987). Formal pre-planning, rules and procedures stating how various aspects of the relationship are to be handled, and pre-designed channels of communication characterize the degree of formalization. An event associated with formalization will be marked with a high value on my scale.

Degree of flexibility refers to whether the parties, when faced with changes in their exchange environment, attempt to enforce the terms of the original agreement or make efforts to modify the original agreement to reflect the new situation (Heide 1987). An event related to flexibility will be placed on the informal governance side of the continuum. Norms of information exchange and norms of mutuality in terms of disclosing information that may facilitate the other party's decision making (Heide 1987) are also directly related to the governance issue. A high association with these norms will place the event on the informal side of the continuum. The governance mechanisms discussed in the conceptual model and above can further be characterized with respect to the following types of attributes:

Table 6.5 Governance mechanisms and attributes

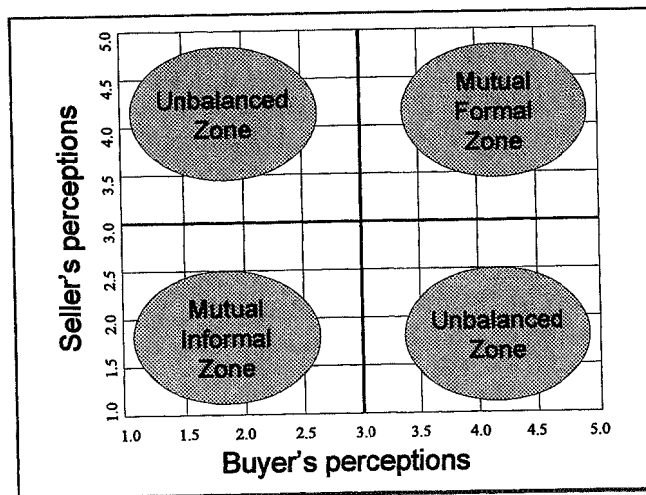
Formal mechanisms	Type of Attribute	Informal mechanisms
Sanction driven, power related, use of authority	<i>Control mechanisms</i>	Cooperative, trust based
Compliance, awareness Comprehensive planning, structural	<i>Managerial ideal</i>	Trust, flexibility, lack of planning, processual
High	<i>Contract status</i>	Low
Structural	<i>Conflict resolution</i>	Political and processual
Unnecessary. Avoidance is the important issue	<i>Conflict status</i>	Normal. Its resolution-process is the important issue
Reduction of transaction efficiency	<i>Effect of conflict</i>	Enhanced effectiveness through new resource- and activity combinations.
Lack of formal precision	<i>Conflict point of origin</i>	Lack of informal interaction and flexibility.
Functional, prescriptive and formal following predefined procedures. Normative	<i>Communication</i>	Informal, cross-functional, open, complex, social

This picture reveals major differences in the assumed point of origin to the conflict, the status-, possible effect-, and resolution of conflict. Related attributes such as control mechanisms, managerial ideal and the issue of communication further sharpen the dividing line between the two paradigms.

6.8.2 Governance zones

The perceptions of the events in relation to the governance mechanisms may either be mutual or unbalanced between buyer and seller. In the following figure, called "governance zone grid", this is illustrated in terms of a mutual informal zone, a mutual formal zone and two unbalanced zones reflecting perceptual differences.

Figure 6.4 Governance zone grid



The informal zone can be defined as a managerial area in which the business relations characterized by informality constitute the fundamental governance mechanism for achieving the main goal of either buyer or seller. Adjacent to the informal zone is the formal zone defined as a managerial area in which the contract, including predefined formalized patterns of behavior, constitute the fundamental governance mechanism for achieving the main goal of either buyer or seller. Relating the position in this matrix to the interplay between conflict and collaboration (Gadde and Håkansson 1993) the two mutual zones indicate a collaborative business atmosphere

with a potential for functional conflict. On the other hand, it is assumed that the unbalanced zones have a weaker collaborative atmosphere and a higher risk of dysfunctional conflict. Each of the positions will be further exemplified in the following:

Mutual formal zone:

An event characterized by contractual deficits belongs to the formal zone. An example can be a buyer who has failed to synchronize major interdependent activities between the sellers in a contract. The challenges here can be divided into two main patterns. One is to improve the contract or formalized routines, steering documents or other predefined patterns of behavior. A second option is to improve the informal mechanisms to reduce the consequences of formal weaknesses. There is, however, a weak point in this position. The formal fundament can be too strong with a risk of jeopardizing willingness to take risk, which is necessary for improving innovation and flexibility. To sum up, both parties agree that formal governance mechanisms are the main source to conflict, and therefore should be improved. Furthermore this is a good starting point for refining the business relationship to improve the collaborative atmosphere.

Mutual informal zone:

Other events are characterized by the way people handle either "unregulated" areas or their inability to understand that the area actually is regulated. The challenge here can include improvements in channels of informal communication or building incentives for relational investments through formal governance mechanisms. Examples include situations where misunderstanding causes an interruption in major activities due to lack of critical resources. The activity or resource interdependencies can also be so complex that no contract or routine except informal relationship could anticipate the situation. Two options are available. One is to strengthen the informal mechanisms through e.g. employee empowerment, a second is to enhance formal governance mechanisms through e.g. more comprehensive operating procedures or computerized systems for exceptions handling (Dellarocas and Klein 2000). The danger signals are that mutual investments in informal governance may cause planning and efficiency problems. Summing up; both parties agree that deficits in informal governance mechanisms is the main sources to conflict, which implicitly should be improved.

Unbalanced zones:

In these two zones buyer or seller are on different sides of the formal-/informal midpoint. This gives an indication of collaborative challenges in relation to interpretation of conflict. Whether planning, contracts,

specifications and other formal mechanisms should be improved or more relational sides should be developed are difficult to decide without aligning the perceptions of what causes the conflict events. The risk of dysfunctional conflict is therefore a threat to the business relationship.

6.8.3 Operationalization:

The construct is derived from two theoretical traditions corresponding to formal- and informal mechanisms. The formal is based on economics comprising transaction cost economics and agent theory where the contract and incentives/price are fundamental elements (Williamson 1990). The formal also includes governance of authority set forth by e.g. Williamson (1990) and Reve (1990a).

Informal governance mechanisms follow a more sociological/relational understanding of the industrial market set forth by e.g. Håkansson (1989) and Håkansson and Snehota (1995). It is also worth mentioning that the relationship between formal and informal governance of economic exchange is discussed by e.g. Reve (1990a) and by Williamson (1990). The latter suggesting a governance trade-off between economic incentives supported by rules on the one side and bilateral adaptability supported by trust on the other side. The degree of formalization of governance mechanisms is also an important issue raised by Macneil (1980) in his discussion of relational contracting. See chapter 3.5.3 for further details.

My construct has been elaborated further to sharpen the division line between the informal trust based governance on the one side and mechanisms embracing authority/economical incentives and rule based governance on the other.

The meaning of a concept is fully and exclusively determined by its operational definition (Frankfort-Nachmias and Nachmias 1996). Hence I need to proceed in bridging the conceptual-theoretical level set forth in conceptual model with the empirical-operational level. This can be done by elaborating the mechanisms into a set of elements that characterize the more practical sides of structure and processes:

Table 6.6 Elements of governance mechanisms

Formal governance	Informal governance
<ul style="list-style-type: none"> • Contract, corporate law • Procedures and routines • Specifications and standards • Monitoring and control 	<ul style="list-style-type: none"> • Shared values • Social exchange/social ties • Mutual trust • Informal communication and culture • Ability to utilize creativity • Ability to explore new activity/resource combinations • Ability to adapt during the process

The elements of governance mechanisms are examples characterizing the events perceived by the informants. Hence the elements do not embrace all aspects associated with the mechanisms nor the events per se.

Relating conflict events directly to the elements is not easy because in a practical situation, a combination of the elements from both sides might be normal. One way is to combine attribute characteristics (table 6.5) with elements of the mechanisms (table 6.6) and construct a few allegations favoring either a formal governance side or an informal side with respect to the individual conflict event. I thus suggest the following set of allegations to the informants as operational definition. The governance mechanisms variable is labeled GOV.

Table 6.7 Operational definitions of the governance mechanisms

Strong formal governance Highest GOV-value (5)	Strong informal governance Lowest GOV-value (1)
<p>The event is primarily associated with:</p> <ul style="list-style-type: none"> • Lack of precision or understanding of contract or specification/standards • Better monitoring and control would prevent the event from emerging • Procedures and routines are important, but not sufficient to prevent emergence of events • Events should be reduced to a minimum in order to keep high project efficiency and effectiveness 	<p>The event is primarily associated with:</p> <ul style="list-style-type: none"> • Lack of informal communication across boundaries • Lack of ability to see new possibilities in improving project activities. • Lack of willingness to take risk together with opposite party • Lack of mutual trust • No predefined rule or routine could prevent the event from emerging • Events are valuable sources to project improvements

Accordingly the conflict events were placed on a scale from 1-5 where 1 indicated a strong informal governance (hence a weak formal governance) and 5 indicated a strong formal governance (hence a weak informal governance). The GOV variable is labeled SGOV for the seller's perception of the governance issue, and BGOV for the buyer's perception of the same.

6.8.4 Structure of measurements

The question is whether the governance mechanism-construct is a theoretical construct requiring creation of more empirical, observable indicators, or the construct can be applied directly. Governance mechanisms are an abstract construct grounded in the theoretical world. The construct therefore has weaknesses, which could be improved by measuring sets of indicators related to the overall importance of a conflict event. These indicators, forming the construct, are set forth in table 6.7. Based on the empirical indicators the question is whether the conflict events should be measured in terms of the indicators of the two governance mechanisms, or directly.

There are at least two major arguments supporting indicators in terms of reflective measurements. Firstly, multiple indicators of the construct opens for multi-trait matrix method or factor analysis to test construct validity quantitatively. Secondly, the construct is not self-explanatory to the informants, which requires some explanations of content prior to assessment of the events.

On the other hand three arguments favor a direct use of the construct in terms of formative operationalization. A formative operationalization of a construct is used when the construct is viewed as an explanatory combination of its indicators (Heide 1987). The construct is thus defined as a total score across a number of items, where each item represents a dimension in its own right.

Firstly, the construct includes a range of different elements describing the extent of formal- versus informal mechanisms. To form these elements into variables for separate analysis of conflict events may easily distort the totality of the construct. There are simply too many facets of the construct that we run the risk of losing crucial concept content by splitting up. Secondly, pilot test of the construct, based on a list of criteria and characteristics of the two mechanisms, indicated convergence in the informants' understanding of the content. Multiple indicators of the construct were therefore found unnecessary and a more serious threat to validity than applying a direct compound measure. Thirdly, by applying several indirect

measures we run the risk of overloading the informants. Simplification is important when informants have to understand a long list of conflict events. The governance mechanism construct was therefore applied directly in the assessment.

6.9 Structure of variable analysis

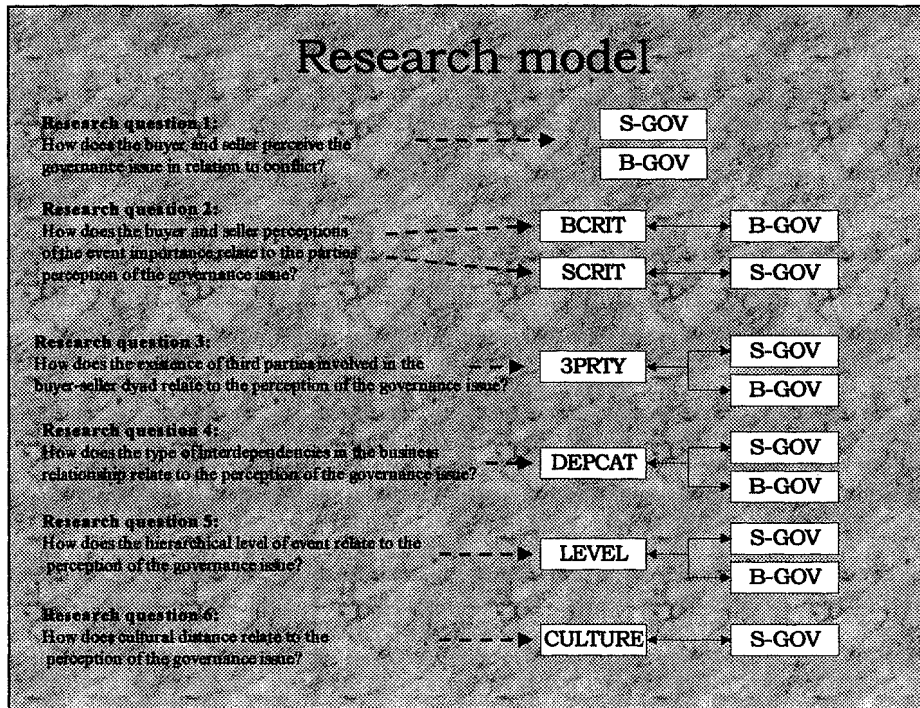
In the first question the governance perception, referred to as BGOV and SGOV, are based on a metric scale from 1-5 where 1 is maximum informal and 5 is maximum formal associated. The variable is applied in calculating mean values across buyer- and seller sides as well as across the cases. The second, importance of event referred to as BCRIT and SCRIT, apply the same scale with 1 low importance and 5 high importance. These are independent variables and tested towards the dependent GOV variables in order to find a correlation between perceived event importance and governance mechanisms. The remaining independent variables expressed through DEPCAT, 3PRTY, LEVEL and CULTURE are all categorical variables embracing 2 or 3 groups. Classification of events into categories is primarily based on researcher's analysis. The variables applied in this can be summarized into the following table:

Table 6.8 Overview of variables in variable analysis

Variable	Comprising	Type	Measurement	Informant
BGOV	Governance mechanism of event	Metric scale	1= Informal governance	Buyer side
SGOV			5= Formal governance	Seller side
BCRIT	Event importance	1-5	1= Low importance	Buyer side
SCRIT			5= High importance	Seller side
DEPCAT	Interdepend.	Categorical	Actor, activity, resources	Researcher
3PRTY	Third party		Yes, no	
LEVEL	Hierarchical level		Strategic, administrative, operational	
CULTURE	Cultural distance		Norway, Korea/Japan	

The relationship between the research questions and the variables and relationship between variables are expressed in the following figure.

Figure 6.5 Research model for variable analysis



Content of the model will be further discussed under validation (chapter 9) and in choice of analytical model (chapter 10).

6.10 Summing up on conceptualization

I have elaborated a conceptual model for my study that embraces structural- and perceptual characteristics of the conflict events. The characteristics are related to the two sets of governance mechanisms. The independent variable was described, related to literature and finally operationalized. Governance mechanisms are of particular interest because they indicate weaknesses in the interaction in which the conflict events emerge. Furthermore these deficits gives an idea as to what is important to improve.

The informal governance mechanism was based on the classical norm based relation type with trust as supportive governance mechanism. Formal governance mechanism, on the other hand, was based on both discrete- and formal relation types supported by incentives and authority.

I have argued that interpreting conflict between buyer and seller in the dyad is related to a project network. This implies that third parties play a role in the phenomenon of interorganizational conflict.

The parties' perception of conflict events related to the two governance mechanisms was depicted into a governance grid consisting of four positions. Two of these were mutual zones where the parties agree on the type of mechanism related to the events, and two unbalanced zones where the perceptions contradict. These positions were further related to the interplay between conflict and the collaboration that is necessary for sound business relationships to evolve.

Finally I have discussed arguments related to use of multiple indicators of the constructs versus a comprised construct. Based on the need for constructs grasping the totality of event importance, and governance mechanisms, I concluded to apply formative measures of the constructs. The conceptual definitions were thus found appropriate as operational definitions.

7. Case descriptions

Three cases are applied in this study. Two are complex projects limited to the fabrication phase of a new type of production vessel and a more traditional oil-rig. The third is not a project, but the base operations in an oil company established to supply goods and services to offshore installations. In the following these will be described. The two projects consist of a conceptual engineering phase, a fabrication phase, hook-up at the field, and an operation phase. The fabrication phase is applied in my case.

7.1 Norne fabrication project

The following is based on Statoil (2001) and experience reports (see appendix 7.1) for the project.

The field was discovered by Statoil and confirmed in December 1991 as the biggest oil find to be made in a number of years. It is located about 200 kilometers from the Norwegian coast. Conceptual engineering started late 1993 and the completed vessel was finished and in full production at the Norne field late 1997. The field has been developed by means of a production and storage ship tied to subsea templates.

The physical entity consists of a hull similar to an ordinary ship and a process unit placed on the deck of the vessel. This functions as an alternative to traditional oil-rigs. Flexible risers carry the well stream to the vessel. Risers, control cables and mooring lines are attached to a central turret allowing the ship to turn so that it is always bows-on to wind and weather. Shuttle tankers can moor to the stern of the ship to load oil.

Main contractors were Maritime Tentech and Kværner Engineering (conceptual and detail engineering), Keppel FELS in Singapore (fabrication of hull), Kværner Rosenberg (fabrication of topside process unit) and Aker Stord (assembly of hull and process unit).

Norne represents the new generation of Norwegian offshore developments. Statoil has succeeded in reducing costs sharply compared with earlier fields, and the project ranks as one of the most cost-effective off Norway. Investment has been reduced by roughly 30 per cent compared to comparable projects, because Statoil, its license partners and Norwegian industrial companies have adopted innovative approaches to developing the field.

Two types of cultural differences are encountered. Firstly, differences between the Norwegian and Asian business culture, secondly, differences between offshore production quality standards applied for traditional oil installations, and the shipbuilding quality standards applied in the hull fabrication prototype. The production vessel was a new concept compared with the more traditional, more expensive and less flexible oil-rig. From this new concept technological innovations materialized. In addition, there are integrated teams embracing both seller and buyer representatives in a unitary organization. There were introduced to speed up decisions and enhance informal cooperation.

Total investment in 1994 money was NOK 8.5 billion. Production capacity is 220,000 barrels of oil per day at plateau. The partners (project owners) are Statoil 24.0 %, the state's direct financial interest (SDFI) 55.0 %, and the remaining 21% is shared between 3 other oil companies. Statoil is the field operator.

The Norne case is of particular interest in this study because of two aspects. Firstly, a new technology and design are introduced. Production vessels are not new, but both the size of the vessel and the topside unit have entailed a large number of technical- and conceptual challenges not experienced in previous projects. Secondly, a new managerial concept was introduced through integrated teams, which blurred the roles of buyer and seller.

7.2 Siri fabrication project

The following is based on Statoil (2001) supplied with project member interviews and unpublished student papers.

The Siri field is a marginal field that required short project planning and fabrication time, with less follow-up costs in order to be profitable. The Siri field was awarded and declared a profitable oil field in 1995. It is located off the coast of Esbjerg in Denmark and expected to produce oil for six to eight years.

The physical entity that was built was a jack-up platform connected onto a seabed storage tank, pipelines and a loading buoy, a so-called integrated PSQ-platform, (Production/Storage/Quarters). The platform was based on a new concept within contemporary design solutions. The short time frame in project execution plan represented considerable challenges as regards

technical solutions, materials, availability of equipment, productivity and financial control.

After a tendering process Kværner Oil & Gas A.S. was picked as main contractor. Contract was based on a target sum, and extensive sharing of risk between Statoil and Kværner in addition to incentives for progress and quality. Statoil decided to follow up the project through an unusually small supervisory group, because of high expectations of strong co-operation with Kværner project management, and high specialist involvement from Statoil base organizations. The field's Danish location required co-operation with Danish governmental bodies, which was a new experience to Statoil. The main challenges were to find technical solutions at moderate prices and at the same time render possible a very fast project execution as concerns activities such as engineering, sourcing and fabrication. Furthermore no reduction in safety and quality standards was allowed.

Total investments are roughly NOK 1.3 billion, or 15% of the investments in the Norne-project. Production capacity is only one fifth of Norne. The field and project were thus significantly smaller than Norne. Partners (project owners) are Statoil 40.0%, and the remaining is shared between 4 other oil companies. Statoil is operator of the field.

The Siri case is of particular interest in this study because it is less complex than Norne. The field is very small, and the time and cost limitations are more important than the innovative aspect, thus acknowledging the strong focus on simplicity in project management and in technical solutions.

7.3 Base operations

The following is based on unpublished student papers and interviews with employees.

The seller is Aker Base A/S, an Aker group subsidiary. The buyer is Statoil Field Support division, which has the responsibility for supplying all Statoil operated offshore installations in the Norwegian sector of the North Sea. Aker Base is supplier of all base services to Statoil from bases in Stavanger, Bergen, and Kristiansund. The service includes loading/unloading of supply vessels and internal transportation. The tasks are characterized as high frequent, relatively simple and easy to plan. Due to political concessions, the seller is in a monopolistic situation. The physical facilities are operated and owned by the seller. The buyer represents approximately 70% of the seller's revenue in this market segment. The buyer defines seller as a supplier,

cooperation partner and a competitor. The seller is trying to convince buyer to outsource a larger share of the total supply chain than only base operations. Combined with the monopoly this puts a considerable pressure on the pattern of interaction.

The interaction is characterized by duration with expectations for a long-lasting future relationship, in addition to strong activity interdependencies. The relationship is characterized as formal with a strong emphasis on contract and incentives. The seller has made significant investments with high asset specificity in terms of facilities and production equipment. The buyer on the other hand has no physical resources, nor competence to carry out the physical supply activities.

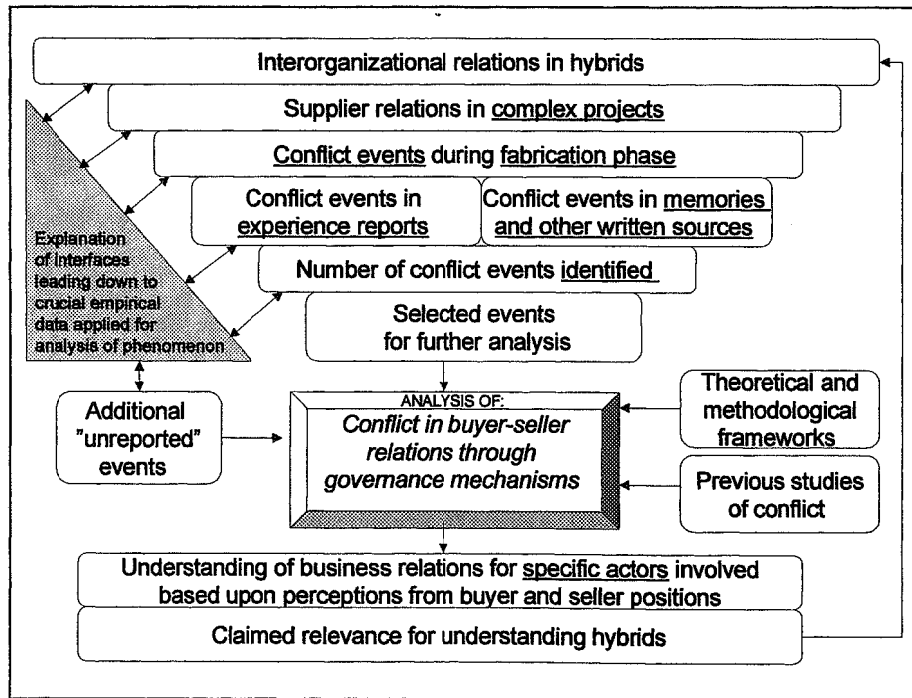
Summing up I find the two complex projects, Norne and Siri as suitable representatives for contemporary projects in the North Sea oil industry. At the same time they reflect different technological- and managerial challenges. This furthermore characterizes different aspects of the business-to-business interaction in which the conflict emerges. Finally, the non-project in terms of a base operation case, serves as a fruitful contrast to the projects. Perhaps the difference between a complex project and a traditional continuous organization is smaller than anticipated.

8. Research design

This chapter specifies the research design based in three sources. Firstly, the methodology discussed in chapter 4, secondly the research questions set forth in chapter 5, and third, conceptual model elaborated in chapter 6.

To approach the phenomenon the empirical basis is crucial. The empirical basis provides sources of data, and should be consistent with the phenomenon and research question. In the following this is illustrated as a loop starting with the phenomenon of interorganizational relations in hybrids and ending up with and an analysis exploring new aspects of conflict in 5 dyadic business relations. The analysis provides results, which in turn aggregate knowledge about conflict in complex projects, which in turn cast further light upon my point of departure, the phenomenon of business relations in hybrids.

Figure 8.1 Empirical basis



The methodology is based on a combination of interviews, survey design and archival study. Archival study is applied in identifying conflict events

and classification of events, and a survey design is used in collecting perceptual data of the events.

8.1 Two step analysis design in event assessment

Firstly, conflict events were identified and described based on archival studies supplied with unstructured key informant interviews. The applied procedure is further described in relation to sampling in chapter 8.2. Secondly, the perceptual aspects were assessed based on a survey methodology involving key informants from both sides. The two main variables in the survey, governance mechanisms associated with the conflict events, and importance of the conflict events, followed a dyadic model analysis. We thus avoid the "single side threat" to validity when focusing on interorganizational properties. This aspect is addressed by John and Reve (1982) and Nygaard (1992).

I have adopted parallelism between the scales. The deletion of one conflict event from the assessment list on one side of the dyad would lead to deletion on the other side. Hence the identity of the events remained exactly the same on both sides of the dyad. The reason for removing items was primarily the difficulties involved in grasping implications of the event or ambiguity in the descriptions of events.

8.2 Sampling

8.2.1 Choice of projects

I have selected two projects with different main challenges in terms of technology and management as presented in chapter 7. Two projects were found important because they reflect different degrees of perceived risk profiles. These profiles may have major influence on the stress of business relations. Furthermore, this implies different perceptions of the conflict events and their mechanisms of governance.

The Norne project embraces introduction of new technology in terms of a production vessel (a new concept) and a new type of production unit. The managerial challenges refer to introduction of integrated teams including buyer and seller in the same project organization. Three main dyads are focused within this project, all having Statoil in the "buyer" role. The first comprises the fabrication yard located in Asia which built the hull of the

vessel. The second includes the Norwegian engineering company that was responsible for production unit design, and finally the assembler of the hull and production unit, a Norwegian Yard. The Siri-project is the second case and referred to as "Siri". Only one dyad is focused, the fabrication yard and Statoil. Base operation is the third case. It is not a project, but serves as a reference to the two projects. Referred to as "Baseops", it comprises one dyad between Statoil as buyer of base-operations and their selling counterpart.

Fabrication projects in the oil industry impose stress in the business-to-business interaction. This stress is reflected in the cases. The cases also reflect different degrees of innovation and uncertainty, to meet the requirement for representativeness. On the other hand, both projects were carried out between 1994 and 1998, and do not necessarily grasp the current changes in technological and managerial paradigms. Furthermore, both are medium/small projects. Large projects that take years to complete have not been included. They were both financially and technologically successful which is not always the case, as financial disasters for buyer and/or seller are also part of the industrial picture. The generality in this respect is therefore the exclusion of the large oil projects and those projects characterized by the most severe financial/technological challenges.

8.2.2 Choice of conflict events:

The goal was twofold. Firstly, to find and identify a significant number of conflict events. Secondly, to ensure a variety of events. Two different strategies were followed. The first applied archival research, whereas the second followed a key informant approach. Whereas archival research dominated the Norne-project, the key informants revealed the events on the Siri-project and the Baseops-case.

The events in Norne were identified through two sources; written experience reports made after completion of main phases of the project, and through interviews with six key informants from the buyer side. (An overview of experience reports is presented in appendix 7.1). The purpose of the experience reports is to support transfer of experience to future projects, and to make sure that policies, routines and standards set forth in the base organization are in compliance with project goals and realities and vice versa. The reports are also applied as a source for further development in supplier organizations. The intention of the reports are thus to increase both the interorganizational interaction, and internal activities and priorities. It is therefore a valuable source for interorganizational research.

On the other hand, some relevant events may have been dropped from the reports without leaving traces. As a further step toward enhancing representativeness, interviews were made with 5 key informants from the project side in order to bring up further events experienced in the specific project. The purpose of the interviews was to supplement events encountered in the experience reports. There is always a risk in any written reports that some critical issues are omitted for some reason or other. The interviews revealed a few additional events. This exercise did not reveal any important new events, thus giving no support for claiming that certain issues were deliberately omitted from experience reports.

Based upon a sum of events stemming from experience reports and interviews the list of events was reduced because of two reasons. Firstly, in order to reduce the risk of overriding key informants in the upcoming assessment process. Secondly, to remove events caused by factors beyond the influence of buyer or seller. The assessment is therefore restricted to events where either buyer or seller has a role in how the event emerged.

From an initial list of 438 events, the final list ended up with 147 events based on the following criteria:

Table 8.1 Procedure conflict episodes list

Norne: Conflict event-list refinement activities	N
Start number identified	438
Reduction of events due to unclear, unambiguous event descriptions.	-18
Reductions of events due to lack of a clear external supplier identity	-23
Reduction of events because the same problem occurred several times from same informant within the same discipline and same dependence category	-85
Reduction of events because the event was primarily an issue outside the buyer-seller dyad.	-15
Available for analysis:	297
-Used for analysis dyad 2	27
-Used for analysis dyad 3	61
= Available for analysis dyad 1	209
- Reduction of events due to perceptual capacity of informant group. Based on researcher judgement of event similarities.	150
= Used for analysis dyad 1	59
Total number analyzed in 3 dyads	147

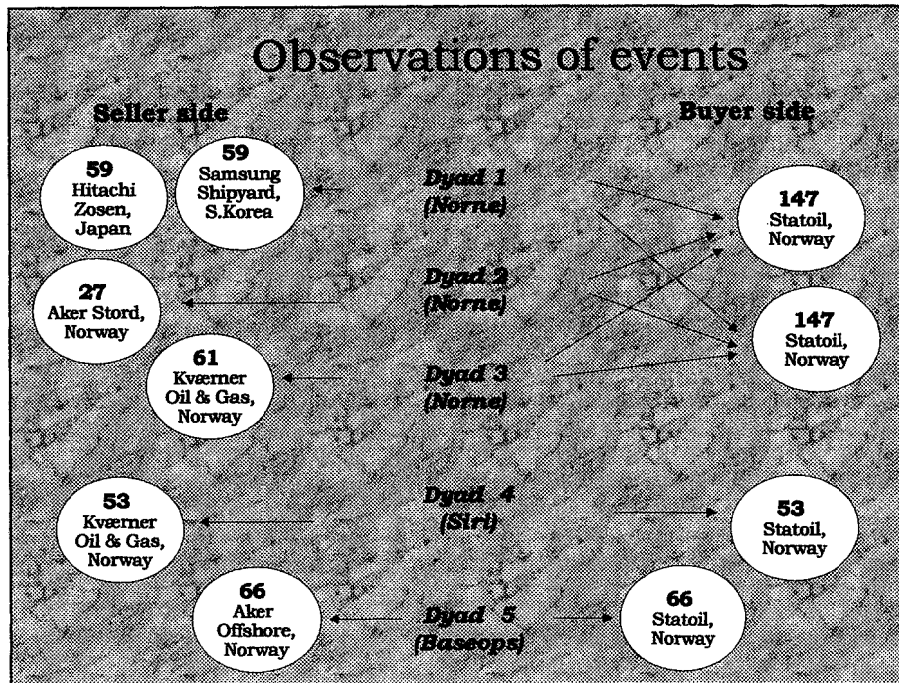
Events from Siri were gathered and formulated by a group of three Statoil employees based upon documents and unstructured interviews. The interviews involved members of the project operation team (the end-customer of the construction), and the main contractor. In addition one of the members of the team, who participated in the focal project, provided useful insight into the project life. The researcher had no other role than challenging the verbal precision of the claimed events. 53 events were gathered and made available for analysis.

52 events in the baseops-case were identified and carried over to analysis after a gathering process carried out by three buyer informants. The researcher's role was restricted to sharpening the precision of the events in co-operation with the buying informant group. Seller side supplied with 14 new events of conflict from their side, adding up to a total of 66 events.

Conflict events are identified differently in Norne compared with Siri and Baseops. This represents a weakness. In the first events are articulated in detailed written sources intended for later improvements. Referring to my discussion in chapter 2.2, an event doesn't necessarily include manifest conflict. This implies that quite normal events might have been included in the reports and identified as conflict events. Compared to conflict events gathered from the two other cases these are articulated directly from the informants for the purpose of this study. A consequence is that Norne events might include a larger portion of insignificant events. On the other hand the number of claimed conflict events is large, and the risk of unevenness is considered too low for practical significance.

A detailed list of all conflict events is compiled in appendix 8.1a and summarized in the following illustration:

Figure 8.2 Event point of origin



The circles refer to the informant groups, and the numbers to the number of events being assessed in each group.

8.3 Unit of analysis

I follow John and Reve (1982), Heide (1987), Nygaard (1992) and Håkansson (1982) who apply a dyadic unit of analysis. Taken into consideration that my theoretical framework is the industrial network approach, the network as unit of analysis was considered. The main reason for applying the dyad is because of the dyadic contracts between buyer and seller. A discussion of formal versus informal mechanisms of governance is found more fruitful having the dyad as unit of analysis, although I fully acknowledge the role of other actors than those included in the dyad, as discussed in chapter 3. The interpretation of the dyad is, however, related to the network of which the dyad is a part.

8.4 Key informants

Assessment of events was based on a key informant methodology. Whereas some scholars within marketing channel research criticize key informants as unreliable, others (e.g. John and Reve 1982) argue that use of key informants can give valuable information if used with caution. Hence there is a latent risk that too close relationships with informants may bias the researcher's report.

Reliability, and key informant validity have previously been tested by John and Reve (1982). The study indicated that key informants from different firms provided reliable and valid data about structural features of the relationship, whereas variables requiring complex social judgements did not. Key informant methodology in interorganizational relationships was further tested in a study by Kumar, Stern and Anderson (1993), which provided two results with regard to informant selection and perceptual agreement among multiple informants.

Firstly, a variety of measures of informant competency was found not to converge with each other. Secondly, significant informant bias was observed between informants. The assessment of informant competency and the use of multiple informant report are thus critical issues to be considered (Kumar et al. 1993). In the extension of this argument I claim that the study of conflict key informants should be selected and treated with extreme caution to safeguard validity and reliability. This was reflected in my approach to potential key informants, where I required long relevant project experience on operational and managerial levels.

8.4.1 Informants or respondents?

A survey methodology applied on organization level phenomena implies a choice of two options, data collection through informants or through respondents. The first option applies the organization as unit of analysis and is not considered as representative in a statistical sense, but is in a unique position to describe the theoretical phenomenon. A respondent on the other hand is connected to the individual as unit of analysis that includes individual feelings or attitudes (Heide 1987). In this study the focus is on the organizations, and not the individual, hence the informant construct is relevant and applied in the further.

8.4.2 Aspects of homogeneity:

Homogeneous samples enhance the internal validity and statistical power, but reduce the external validity. In this trade-off informants are collected as close as possible to the focal projects and dyads in spite of the fact that a broader base of recruitment would possibly enhance generality. This is particularly relevant to the buyer informants when all were recruited from one oil company (although from different business units). Several important factors are kept constant on the buyer side, such as company policy, culture and environmental factors. This threatens construct validity, and statistical conclusion validity (Cook and Campbell 1979). Furthermore, the projects from which the dyads are derived were financially successful. The homogeneity of the dyads may therefore lack representativeness for other projects with financial problems, higher tension and more legal disputes in the dyads.

8.4.3 Procedure for selecting key informants:

They were asked by the researcher to participate, orally or in writing as further outlined in appendix 8.2 and 8.3. Buyer representatives, counting 12, were recruited from a master-program in "Supply Chain Management" carried out by Norwegian School of Management BI for Statoil. The seller-informants were chosen partly with based in prior participation in the actual projects, or they were appointed by the management in the companies. Due to an unresolved conflict with a legal dispute between Statoil and one of the selling yards in Asia, seller assessments were substituted with informants from two other Asian shipyards. I thus argue that the scrutiny of events included in a legal dispute represents a severe threat to validity. The two yards have prior experience with similar fabrication projects, and with Norwegian buyers as the focal yard. The two yards were thereby considered as relevant substitutes.

8.4.4 Representativeness in event assessment:

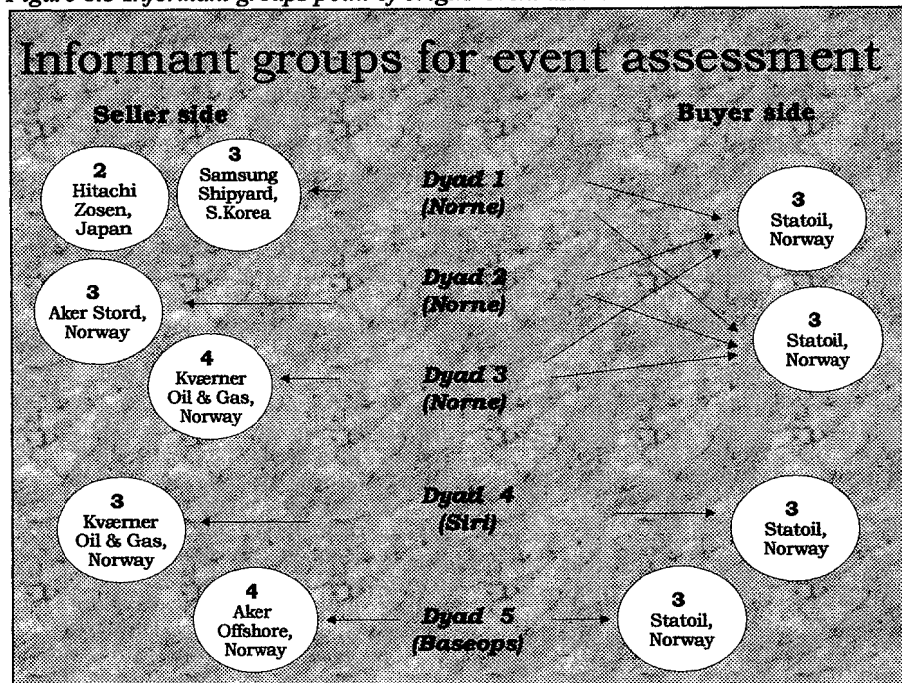
The diversity of informants and their experience support the representativeness. The average relevant working experience within complex oil projects were 22 years for the seller side and 15 years for the buyer side, ranging from 5 years to 27 years. Furthermore there is diversity in the seller group with respect to knowledge of the project in which the events occurred. Two of the five groups were not aware of the identity of the project, and were not involved in the actual project. This adds some distance to the

events, thus ensuring variety and representativeness. On the other hand the buyer sides were solely represented by Statoil, which reduces the representativeness of the buyer side. At the time of assessment all Statoil informants were attending the supply chain management-program and therefore ran the risk of being too streamlined in interpreting the events. This challenge was met through a mix of informants from different managerial levels. An overview of key informants, their role, and background are presented in appendix 8.4

8.4.5 Forming informant groups:

Informants to Norne events consisted of 4 seller groups. Two groups were formed from companies directly involved in the actual project and two groups were not involved. This represents a variety in closeness/distance to the events being assessed. The buyer side consisted of two groups. See appendix 8.4 for further details on informants.

Figure 8.3 Informant groups point of origin/ event assessment



The numbers in the circles refer to the number of key informants in each assessment group.

Dyads 1,2 and 3 were derived from the same project. The fourth dyad (Siri) represents less complexity and included one informant group from each side. Informant groups from both sides had a balance of experienced and less experience individuals in the groups, as further outlined in appendix 8.4.

To summarize the group members applied in event assessment were considered highly competent and possessed a varying degree of closeness/distance to the event being assessed. The judgement, based on a group consensus, is therefore found acceptable.

8.5 Summary of events and informants

The analysis is based on 200 conflict events gathered from projects, and 66 from a non-project context, overall 266 events. These were analyzed in terms of structural- and perceptual aspects involving informants from both the buyer-side and the seller-sides. These observations sum up to a total of 413 buyer-observations and 325 seller-observations, overall 738 observations. The database should be sufficient for several types of variable analysis. A detailed breakdown of the empirical figures is illustrated below:

Table 8.2 Breakdown of empirical base:

Number of:	Norne				Siri	Sum projects	Base ops	Sum
	Dyad 2	Dyad 3	Dyad 1	Sum				
Events	27	61	59	147	53	200	66	266
Buyer observ.	54	122	118	294	53	347	66	413
Seller observ.	27	61	118	206	53	259	66	325
Sum observ.	81	183	236	500	106	606	132	738
Buyer inform.	6			6	3	9	3	12
Seller inform.	4	4	5	13	2	15	4	19
Sum inform.				19	5	24	7	31

All events are understood and accepted by both parties. It is, however, important to stress that the parties may have different opinions as to who is to blame for the event. Acceptance of the events is thus restricted to being a phenomenon causing various degree of criticality for at least one of the parties.

8.6 Summing up on research design

Events of conflict were identified and formulated based on archival studies supplied with unstructured key informant interviews. Secondly, the perceptions of the events were based on a survey methodology involving key informants from both sides, thus applying the dyad as unit of analysis. The assessments followed two data collection strategies, firstly applying key informants in collecting perceptual data, secondly applying archival research in collecting structural data. A total of 266 events were assessed leading up to a total of 738 observations. This is acceptable for statistical treatment.

9. Validation

A common definition of validity is whether we really measure what we intend to measure (Reve 1985). Validity is concerned with how we measure what is intended to be measured, and presuppose a proper reliability. Two persons can agree in the concrete observations (good reliability), but measurements can be irrelevant to the intended construct (Rudenstam and Newton 1992).

This implies two challenges. Firstly, to improve validity through proper use of methodology, theory and tools. Secondly, to be able to measure validity for comparison with a standard. In this chapter I will discuss different types of validity, primarily in relation to the efforts in improving validity. In my conceptual design I have applied formative compounded measures (see chapters 6.6 and 6.8) instead of a multiple indicators as expression of the construct. This limits us in performing e.g. multi-trait tests of validity. The tests are limited to one test of key informant consistency.

Based on the research design I find construct validity, statistical conclusion validity and external validity most relevant. This will be discussed in the following.

9.1 Construct validity

Construct validity addresses the importance of successful operationalization of constructs. We should thus be aware that variables never measure only the construct of interest, but irrelevant characteristics as well. In the following, five subgroups of construct validity will be discussed: face validity, convergent validity, and divergent validity. In addition reliability is added.

9.1.1 Face validity

A discussion of face validity can be related to two levels, one theoretical, and one empirical related to the informant's understanding of the main constructs. The theoretical level includes at least four questions in relation to my study:

1. Does the measuring instrument, composed of the GOV-variables, measure the relevant characteristics of conflict in complex projects? I have argued in chapter 2.7 that it does.

2. Is the conflict event-construct a valid way to reveal the most important aspects of conflict in business relations? Or does it only reveal partial, isolated problems on expense of the real underlying dimensions? This was found acceptable in chapters 2.2 and 2.3.
3. Is there consistency between the instrument with its characteristics and the theory (Industrial Network Approach)? The consistency was confirmed in chapter 6.
4. Can the CRIT-variables measure more than the marginal importance of the events, thus hiding the accumulated effect on goal achievement? I argue that it does, as concluded in chapter 6.6. Informants applied in validation of the results have, however, claimed strong uncertainty in this measurement.

Accordingly I argue that face validity is acceptable from a theoretical point of view

The second level deals with the informants' understanding and familiarization with the applied constructs. Face validity is a rather informal and highly subjective test where the investigator's subjective evaluation of the validity of the measuring instrument is carried out. In order to enhance face validity the informants were not challenged on why the events occurred, and who caused their emergence and growth. The most controversial issues in relation to the events were therefore not addressed in the research questions. This was communicated to the informants prior to start-up of the event assessment, in addition to other relevant assumptions as listed below:

Table 9.1 Information given to informants

Disclosed information to enhance construct validity	
1	It was stressed that the conflict events were not a part of a supplier/seller assessment, but rather a tool for understanding governance of events per se.
2	In order to ease possible informant worries, it was stressed that the selection of the individual events was based on sound and successful business relations. It is easier to discuss conflict in a success story than a disaster.
3	Informants were told that the opposite party in the dyad considered the focal party as parts of a fruitful business relationship.
4	Both sides were informed that the events were not necessarily true. Some of the events were even constructed by the researcher to focus on a specific phenomenon.
5	The events were gathered from projects completed a few years prior to the event assessment

In order to test the face validity of the events a two-step test was carried out. First the events were presented to representatives from the seller and the buyer side with the purpose of sharpening or deleting unclear and ambiguous events. This was carried out a few weeks prior to assessments in order to verify the clearness of the event descriptions. A few events were considered unclear and either sharpened or removed from the list. The second test was carried out the day of assessment where the informants were invited to request amplification of the event. If the researcher failed after consulting experience reports, the event was deleted from the list. Less than 3% of the total number of events was deleted with basis in these tests.

To ensure face validity of the governance mechanisms construct, a two-step test was carried out in connection with the data collection process. The first step was made using key informants from the buyer side for testing understanding of the constructs set forth in the conceptual model in relation to practical management. No major adjustments were found necessary. The second step was made the same day as the assessments. The informant group was presented with 10 random events and asked for their interpretation and understanding of the following constructs: Conflict event, informal- and formal governance mechanisms and event importance. The constructs were further clarified and finally found acceptable by the informant group.

I have argued for the relevance and fruitfulness of applying the GOV-variable in understanding aspects of events leading to conflict. In order to achieve consistency between the measurement instrument and the network theory, however, some awareness is required. Some of the conflict events are actions or episodes that can hardly be isolated and assessed regardless of their interdependencies. In total this doesn't challenge the overall construct validity.

9.1.2 Convergent validity

Through convergent validity we test the ability to obtain corresponding results when applying different methodologies. In this study I apply only one type of variable analysis. On the other hand, I can approach convergent validity by applying the same methodology and conflict events, but alter the set of informants. One of the dyads in Norne contained two sets of buyer-perceptions and two sets of seller perceptions. Correlation between the two groups of buyer perceptions, and between the two groups of seller perceptions was found. The tests were based upon the exact same conflict events in order to check validity of the constructs:

Table 9.2 Key informant consistency

	BGOV1 vs BGOV2	SGOV1 vs SGOV2	BCRIT1 vs BCRIT2	SCRIT1 vs SCRIT2
Number of project events tested	59	59	59	59
Percentage of total project observations	29,5%	29,5%	29,5%	29,5%
Pearson correlation coefficient	0,785**	0,250	0,637**	0,217
Sig. 2-tailed	0,000	0,056	0,000	0,099

** significant at 0,01 level

The buyer perceptions are highly correlated and within 0,01 probability level. The seller perceptions are found insignificant. There are two main reasons for this. Firstly, the buyer perceptions are based upon a refined list of events where events indicating a standard deviation $>1,5$ between the 6 buyer informants, assessments were deleted from the list. Secondly, the seller informants in this group assessed the events without knowledge of the project (-s) identity. As discussed previously, it is very difficult to make an assessment without knowing the identity and project history. I thus believe that the selected 59 seller assessments have less validity than the other groups of seller informants.

The perceptions of SGOV are close to the 0.05 significance level ($p=0,056$). The perceptions among seller groups for the same events may be different, not because of an error element in the construct, but as a result of a true component. Perceptions of SCRIT are insignificant and the assessment of event importance is extremely difficult without knowing more about the project than "isolated" events taken out of their embedded context.

Summing up; the quantitative test of construct validity was found acceptable for the main variables BGOV and SGOV, but found weak for SCRIT for the Norne-project in terms of p-value. The correlation coefficients were low on the seller sides, but different seller perceptions of the same events may be natural and appropriate. Taken together the findings do not require deletion of variables.

9.1.3 Discriminant (divergent) validity

This deals with the separateness of one construct from another. The operationalization of the two governance variables (formal- and informal governance mechanisms) should be separable to avoid them being confounded. Quantitative tests require multiple measures to the constructs. By applying only one construct empirical validity test are strictly limited.

9.1.4 Reliability

Reliability is a check to ensure that later investigators have arrived at the same findings and conclusions under similar circumstances as in the particular study (Yin 1994), that the observations are free from random errors of measurements (Dooley 1990), and entail consistency (Rudenstam and Newton 1992). Any measurement instrument is, however, rarely completely valid because it contains one true component and one error component.

Several factors represent challenges to reliability in this study. One is simply the problem of remembering the past. Furthermore, possible distractions, misunderstandings, and the like also trigger reliability awareness (Rudenstam and Newton 1992). Another danger is the researcher "going native" by giving up the neutral scientific perspective and thus becoming a committed member of the group under study (Dooley 1990). A further question for the study of conflict and other sensitive matters is whether the investigator is capable of gaining the necessary trust and friendship without reciprocating some genuine affection. Working alone enhance the risk of that. Based on the large number of observations (n=738) in the study a further reliability test was considered unnecessary.

9.2 Statistical conclusion validity

Through statistical conclusion validity I address the risk of drawing false conclusions of covariance from statistical analysis. Choice of analytical techniques and related assumptions, sample sizes and statistical significance etc. are relevant and will be discussed in my test of assumptions (chapter 10) and in the statistical analysis (chapter 11).

9.3 External validity

This is related to two main choices made in this study. First the choice of conflict events. This further embraces three sub-choices; the choice of complex projects, dyads within the projects, and finally the conflict events derived from the dyads. Possible threats and choices related to these were discussed in chapter 8.2 Sampling. The second group is related to the choice of key informants that embrace assessment of the conflict events in the first stage and assessment of causes and effects related to informal governance mechanisms in the second stage of my study. This was discussed under chapter 8.4 Key informants. To sum up, I have found the procedure for securing external validity acceptable.

9.4.1 External validity related to the choice of projects and dyads

The context is fabrication projects in the oil industry. The number of ongoing projects has been between 5-10 in the last decade. Which of them, and how many should be selected in order to explore conflict? This further leads to a discussion of internal versus external validity. Whereas a homogenous set of projects may enhance the consistency and internal validity, generality in terms of high external validity will be traded off.

In this study the question is to which extent the findings can be generalized beyond the cases of which the events are extracted. The answer consists of three elements: The first deals with the question of representativeness of the projects for understanding the phenomenon. The second deals with the representativeness of conflict events derived from the projects. The third deals with the question of representativeness regarding the key informants who assessed the events. Thus external validity will depend on these three answers.

9.4.2 External validity related to the choice of conflict events.

The large number and variety of events fulfill the demand for representativeness. On the other hand, the events are chiefly found in experience reports which do not fully grasp the driving forces of the events, such as those emerging from strategy and managerial philosophy in the base organizations. The events are also only derived from the fabrication phase and not from the conceptual- and operational phases of the project. The generality is therefore constrained. I thus conclude that the study calls for awareness with regarding generality beyond the context of complex projects.

Summing up, I admit that lack of multiple measures strictly limits test of validity commonly applied in a variable analysis. The weakest point is related to my use of formative compounded measures for the governance mechanism-construct because this prevents us from the use of multi-trait test of convergent and discriminant validity. A test of convergent validity, applying the same method and events, but different sets of informants, supported construct validity. My procedures to improve construct validity and external validity was described. Statistical conclusion validity is discussed in the following two chapters.

10. Choice of analytical model and test of assumptions

10.1 Type of analysis

This study is based on two dependent variables (BGOV and SGOV).

BGOV: Buyer's perception of conflict event's association to the two governance mechanisms.
SGOV: Seller's perception of conflict event's association to the two governance mechanisms.

The purpose is to investigate the role of formal- versus informal governance mechanisms (GOV-value) in relation to a set of conflict event attributes. Since I consider conflict events as being social constructs, I have to recognize the perceptions of both buyer and seller. Taken into consideration that the assessments are based upon exactly the same event formulations I have two options:

1. To study each dependent variable (BGOV and SGOV) separately, recognizing two perceptual sets of complete information.
2. To study both dependent variables simultaneously, thus focusing on the differences or similarities in event perceptions. This is further based upon the assumption of inter-correlation between the dependent variables.

My emphasis is on option one, which means that I apply only one dependent variable. The arguments supporting inter-correlation among the two dependent variables are weak, mainly because interpretation of the events is based on two quite different positions. This further implies the use of univariate analytical techniques, rather than a multivariate that is relevant for option two.

The two dependent variables reflecting the conflict events' association to the governance mechanisms, SGOV and BGOV are metric. Furthermore two of the independent variables measuring event importance, SCRIT and BCRIT are also metric.

SCRIT: Seller's perception of the importance of the conflict event.
BCRIT: Buyer's perception of the importance of the conflict event.

A correlation analysis is found fruitful in finding the relationship between GOV and CRIT-variables. The remaining independent variables are categorical, which can be solved by simple T-tests for the two-group independent variables and ANOVA for the 3, and 6-group variables. By means of t-test and ANOVA I test whether an observed difference between the groups on GOV-mean is due to a treatment effect or to random sampling variability (Hair et al.1998).

An overview of the independent and dependent variables, group sizes and selected analytical tools is presented in table 10.1.

Table 10.1 Groups within independent variables and dependent variables

Ques- -tion	Independent variable	Gro- ups	Dep. Var.	Type of analysis	
1a	The event's association to the two governance mechanisms	BGOV & SGOV	-	Univariate t-test	
1b					
1c					
2a	Seller's perception of importance	SCRIT	-	SGOV	Univariate correlation
2b	Buyers' perception of importance	BCRIT	-	BGOV	
3	3 rd party participation	3PRTY	2		Univariate t-test
4	Dependence category	DEPCAT	3	SGOV &	3-group ANOVA
5	Hierarchy level of event	LEVEL	3	BGOV	
6	Cultural distance	CULTURE	2	SGOV	Univariate t-test

10.2 Testing assumptions by means of T-test and ANOVA

Three assumptions have to be fulfilled. Firstly, independence of observations, secondly, normal distribution of the dependent variable, and finally homogeneity of the variance of the dependent variable between the groups (Hair et al.1998).

10.2.1 Independence among observations

One general assumption for any analysis is independence of observations. This was secured through the following: All events were assessed after project completion, and thus assumed to be independent of ongoing activities. Buyer and sellers have made assessments of GOV and CRIT-variables under the researcher's observation and without interference from the other party. Remaining variables were assessed by the researcher, partly based upon written sources and partly based on discussion with informants. Observations are thus considered to be in compliance with independence requirements.

10.2.2 Normality

A study of the graphic plot and statistical test, as presented below, indicated deviation from normality assumptions.

Table 10.2 Test for normality

	Skewness		Kurtosis		Kolmogorov-Smirnov test			
	Stat Mean	Std Error Mean	Stat	Std. error	Stat	Std. error	Stat	Sig.2-tailed
BGOV	1,80	6,25E-02	1,601	0,151	2,185	0,302	0,232	0,000
SGOV	2,59	8,83E-02	0,456	0,151	-1,153	0,302	0,242	0,000

For the BGOV variable the observations are positively skewed towards low values, and strongly peaked. Both variables show significant deviation from normal distribution because of the p-values (<0.01) on the K/M test. Violation of this assumption has, however, little impact with larger sample sizes (Hair et al.1998), which I have.

10.2.3 Homogeneity of the variance of the dependent variable between the groups

Assumption of equal variance for all treatment groups was tested by Levene's test as suggested by Hair et al. (1998).

Table 10.3 Levene's test of equality of error variables

Dep.variable	Indep.variable	F-value	Sig.2-tailed
BGOV	LEVEL	19,155	0,000*
	DEPCAT	11,977	0,000*
	3PRTY	0,593	0,442
SGOV	LEVEL	3,078	0,048
	DEPCAT	2,435	0,090
	3PRTY	14,781	0,000*
	CULTURE	3,368	0,068

*) Significant deviation from homogeneity assumption at 0.05 probability level.

Two out of three BGOV treatments and one of four SGOV treatments indicate no compliance with assumption at 0,05 level.

These tests reveal deviation from assumptions relating to normality- and homogeneity. However, T-tests and ANOVA are robust toward assumption violations except in extreme cases (Hair et al.1998), such as small cell sizes and few observations. As listed below both the total number of observations and cell sizes are relatively high, leading to the conclusion that the T-test and ANOVA are acceptable for my analysis.

10.2.4 Group cell size

The cell sizes, outlined below, are sufficient for a small to medium effect within 0,80 power (Hair et al.1998). The low number of groups and only one dependent variable are elements supporting the conclusion.

Table 10.4 Observations and group cell sizes

Treatment	Number of groups	Cell sizes	Number of observations
LEVEL	3	29,77,153	259
DEPCAT	3	54,79,126	259
CULTURE	2	83,123	206
3PRTY	2	112,147	259

Summing up, univariate analysis was found appropriate. This implies use of univariate t-tests, univariate correlation analysis and ANOVA. The assumptions were met with regard to independence among observations. Test for normality and for the assumption of equal variance for all treatment groups indicated deviation statistically and in graphically. The robustness of tools and sample- and cell sizes was strong enough to conclude that no violations of the assumptions have any significant effect on the study.

11. Empirical findings, stage one

In this chapter the findings related to research question Q1 to Q6 will be discussed. In the first section the perceived association between conflict events and the governance mechanisms will be discussed. In the second section a possible correlation between conflict importance and type of governance mechanisms will be explored. Finally, four structural factors characterizing the conflict events will be discussed and related to the governance mechanisms.

11.1 The governance perceptions

Referring to research question set forth in chapter 5 (question labeled Q1) the finding reveals how the buyer and seller sides perceive the governance mechanisms in relation to conflict events. This question is further split into three sub questions, of which the first is:

Q1.1 When events of conflict are identified in complex projects, to what extent are these related to formal governance mechanisms from the buyer's- and seller's point of view?

The findings are outlined below and further discussed in the end of chapter 11.1.

11.1.1 Seller perceptions:

The mean values of seller perceptions are based upon 259 project observations. As outlined in the following table, seller perceives the events more related to informal governance mechanisms than formal, as the mean $X=2,59$ is below the midpoint of 3 on the scale. There is however close to an even mix of the two mechanisms. Furthermore, events from the Siri project and Baseops are considered to be more relational than those derived from Norne project. Hence this indicates that events from an innovation type of project has a stronger tendency towards formal mechanisms than more straightforward challenges, where the risk of failure is lower.

Table 11.1 Degree of formal- versus informal governance mechanisms perceived from seller side

Seller perceptions of governance mechan.	N	Mean (XS)	t-value	p-value (2-tailed)	Std. Dev.
Projects (Norne+Siri)	259	2,59	29,302	0,000*	1,42
Norne	206	2,69	26,283	0,000*	1,47
Siri	53	2,17	14,078	0,000*	1,12
Baseops	66	2,15	13,407	0,000*	1,30

* significant at 0,01 level

11.1.2 Buyer perceptions:

Turning to the buyer-perceptions I see a strong informal association with a low mean value ($X_B=1,80$). When comparing the different empirical contexts, the results indicate a significant higher relational tendency on Norne than Siri and Baseops ($X_B=1,71$ versus $X_B=2,11$ and $2,44$).

Table 11.2 Formal- vs informal governance mechanisms perceived from buyer side

Buyer perceptions of governance mechan.	N	Mean (XB)	t-value	p-value (2-tailed)	Std. Dev.
Projects (Norne+Siri)	259	1,80	28,730	0,000*	1,01
Norne	206	1,71	28,288	0,000*	0,87
Siri	53	2,11	11,132	0,000*	1,38
Baseops	66	2,44	13,999	0,000*	1,42

* significant at 0,01 level

11.1.3 Differences Norne versus Siri-project

The second sub question is related to differences between the Norne and Siri cases, and is formulated as:

Q1.2 To what extent do the project findings differ with regards to the type of project challenges?

From the seller's point of view Siri is characterized by a stronger informal tendency than Norne ($X_S=2,17$ versus $X_S=2,69$). On the buyer side I see the opposite tendency. The informal tendency is strongest for Norne ($X_B=1,71$ versus $X_B=2,11$). In other words the most complex innovation type of

project drives the seller towards a more formal direction, and the buyer in a more informal direction, than in a more straightforward project.

11.1.4 Differences between projects and Baseops-case

The third sub question related to differences between the two project cases and the non-project, and is formulated as:

Q.1.3 When events of conflict are analyzed the same way in a non-project context, to what extent do findings support the findings in a complex project context?

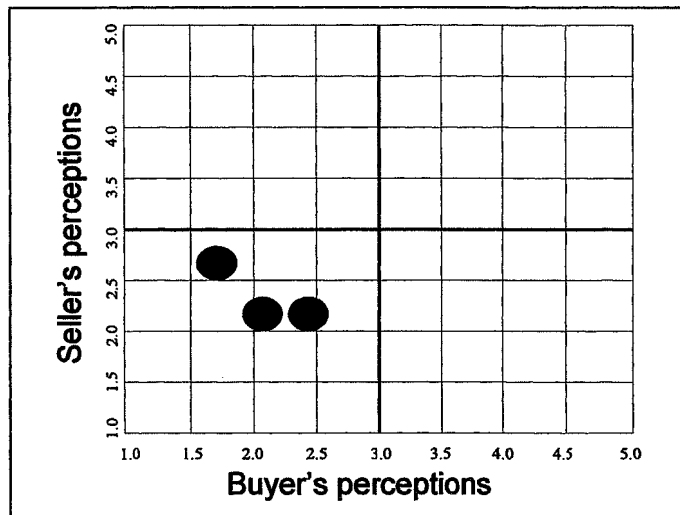
The finding in the Baseops-case is close to the straightforward Siri project. This makes sense in the way that they both experience less complexity and less relational tension compared to Norne. Furthermore the perceptual difference between buyer and seller is more harmonized than in a tense Norne project.

Some of my informants argued that in the Baseops-case it is easier to formalize and follow up because the events are recurrent in a continuous value chain. Recurrent events are easier to relate to established routines than the project, thus increasing the formal tendency for both parties. Others supports my quantitative findings by arguing that the project and non-projects (e.g. Baseops) are not so different. They both rely on the actor's set of past experience and history.

11.1.4 Discussion of the findings

Still recognizing both the perceptual differences between the buyer- and seller role, and between the three cases, my main emphasis is that the relational aspect of conflict is very clear. They all belong to the balanced relational side in the governance grid defined in chapter 6.8 and illustrated below.

Figure 11.1 Governance grid



Why do the parties perceive conflict between them as a matter of informal judgement rather than as a matter of contracts, specifications, routines, and procedures? Taken into account the large resources spent in the base organizations on developing managerial-, technological and conceptual details prior to start-up of a project, one would imagine that conflict events would be associated with this reality. The findings, however, give us an indication of the opposite in terms of freedom of choice and sound judgement.

These findings were presented to the informants in stage two of the study in order to verify the findings. In general the key informants acknowledged the differences in the perceptions of buyer- and seller. The experience of the more informal buyer and the less informal seller coincided. Secondly they agreed that events stemming from an innovative type of project would most certainly be perceived informal compared to non-innovative/non-projects. Thirdly, the high level of relational importance on both project types was more surprising. Two informants even claimed that an assessment of the business relation per se, without going through the conflict event-perceptions, would probably end up in a formal governance-zone. In total the informants did not reveal significant doubt about the findings.

Summing up, I have four significant findings. Firstly, conflict events are significantly more associated with informal governance mechanisms than formal. In general both the seller and the buyer agree, and the parties thus

enters the mutual informal zone in the governance grid. Secondly, the buyer/seller perceptions separate more in the Norne-project compared with Siri. This can be explained by differences in the distribution of risk between the parties. Thirdly, the seller side seems to go formal when the degree of innovation and functional risk is high, which is expressed through the Norne-case. From the buyer's perspective it is opposite with a shift towards the informal side.

11.2 The governance-perceptions and the importance-perceptions

The research question Q2 addresses a possible relationship between perceived importance of an event and type of governance mechanism associated with the event. How do the perceptions of buyer and seller as to the importance of the event relate to the parties' perception of the governance mechanisms?

In this section I seek to conclude whether it is the less important or the most important issues that are related to the two sets of governance mechanisms. This is done by a test of correlation between perceived importance of the event and the metric scale representing the continuum between the two mechanisms.

More specifically the question is split into two sub questions:

Q2.1 Based upon the seller's perception of the importance of event, how does this relate to the perception of governance from seller's side?

Q2.2 Based upon the buyer's perception of the importance of the event, how does this relate to the perception of governance from the buyer's side?

11.2.1 The analysis

When comparing the relationship between the perceived importance of the event and governance mechanisms the following pattern emerges. On the seller side there is a significant, and positive correlation ($p=0,000$) between importance and degree of formal governance. The higher the perceived importance, the higher the tendency towards formal governance, revealing a correlation coefficient of 0,223 on the total project population.

Table 11.3 Correlation between importance and the mechanisms on seller side:

Seller perceptions of governance mechanisms	N	Pearson corr.coeff	Sig 2-tailed ()
Project population	259	0,223	0,000**
Norne	206	0,152	0,029*
Siri	53	0,393	0,004**
Baseops	66	0,049	0,697

*) significant at the 0.05 level **) significant at the 0.01 level

One the buyer side no significant correlation is found for the projects in total. Siri, however, indicates a tendency towards significance ($p=0,061$) with positive correlation coefficients (0,259).

Table 11.4 Correlation between importance and mechanisms on buyer side

Buyer perceptions of governance mechanisms	N	Pearson corr.coeff	Sig 2-tailed (p)
Project population	259	0,088	0,156
Norne	206	-0,037	0,596
Siri	53	0,259	0,061
Baseops	66	-0,307	0,012**

***) significant at the 0.02 level

11.2.2 Discussion of the findings

The assessment of importance included some weaknesses. Firstly, that the assessment of event importance was based on a strictly limited summarized description of the events (8-10 words). It is therefore difficult to fully understand the implications of the events with respect to importance. Secondly, the events have been assessed with a risk of shallowness due to different cultural background, attitudes and experience among informants. Thirdly, this is a strictly partial analysis, and does not take into considerations the multiplier effect of the event. This can be illustrated by one event having a low direct effect on the main goal per se, but combined with one or two other activities (which is hard to grasp by the assessor) the effect can be dramatic. My informants from Japan and South Korea addressed this aspect by claiming that partial assessment would most certainly result in a stronger formal governance tendency than when assessing the total chain of events. Hence applying the chain of event-perspective rather than the partial perspective would imply a stronger element of informal governance mechanism. As a consequence the informal aspect can be suppressed in my study compared to a more holistic approach.

Taking the limitations into consideration, the seller perceptions thus indicate that important events have a tendency towards formal governance. This is backed by key informants who claim that the most important events have financial consequences for the seller. These consequences lead to a formal pattern, because it is easier to claim payment within a formalized governance structure. Others argue that all types of important events, including non-financial related events, generally lead to formal governance. One should thus expect a positive correlation. At any rate a large number of critical and important events are not associated with lack of predefined rules, procedures and contracts established to avoid the dysfunctional side of conflict.

Summing up, I find a significant relationship between the importance of a conflict event and formal governance perceived from the seller side. This holds regardless of case. However, the findings suffer from conceptual weaknesses that reduce face validity of this particular finding (see chapter 9).

11.3 Structural factors and the governance perceptions

The research question Q3, Q4, Q5 and Q6 are organized under this chapter. In the following different characteristics describing the events will be explored and discussed. This is based upon characteristics of the conflict events in terms of type of interdependencies, third party involvement, hierarchical level and cultural distance. These characteristics are related to the governance mechanisms in the following.

Table 11.5 ANOVA for group differences in the governance issue (test of differences between subjects)

Independent variable	BGOV (Buyer perceptions)			SGOV (Seller perceptions)		
	F-ratio	Sig.2-tailed (p)	Mean (XB)	F-ratio	Sig.2-tailed (p)	Mean (Xs)
DEPCAT	7,14	0,001**	Activity: 1,70 Actor: 2,13 Resource: 1,53	2,54	0,081	No sign
3PRTY	3,15	0,077	No sign	16,96	0,000**	No: 2,28 Yes: 2,99
LEVEL	19,07	0,000**	Adm.: 1,79 Ops: 1,61 Strat: 2,79	3,87	0,022*	Adm: 2,70 Ops: 2,42 Strat: 3,17
CULTURE	N/A	N/A	N/A	1,26	0,263	No sign

*) significant at the 0.05 level **) significant at the 0.01 level

11.3.1 Type of interdependencies (DEPCAT) and the governance-perception

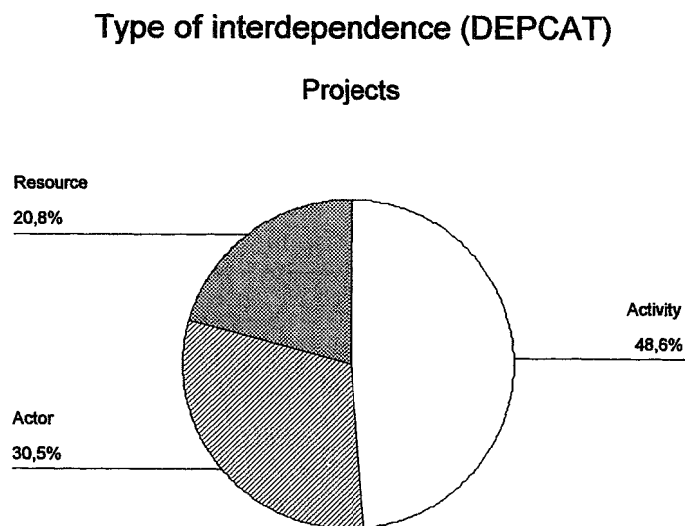
Q4 The industrial network approach set forth three types of interdependencies in a relationship. How does these types differ in relation to formal and informal governance mechanisms?

This question refers to my discussion about the complex project as part of an industrial network (chapter 3), where I described how three types of interdependencies impacted on the business relationships. In the following the events will be grouped into the three types, and the role of these will be discussed in relation to the emergence of conflict. This will form the basis for an analysis of interdependence categories and the governance issue.

Distribution of interdependency-groups:

Activity interdependencies are most frequent (49%), and resources are the least frequent (21%). Nevertheless all three types are present, which calls for a broad attention towards all the elements comprised in a business relation. This is illustrated below.

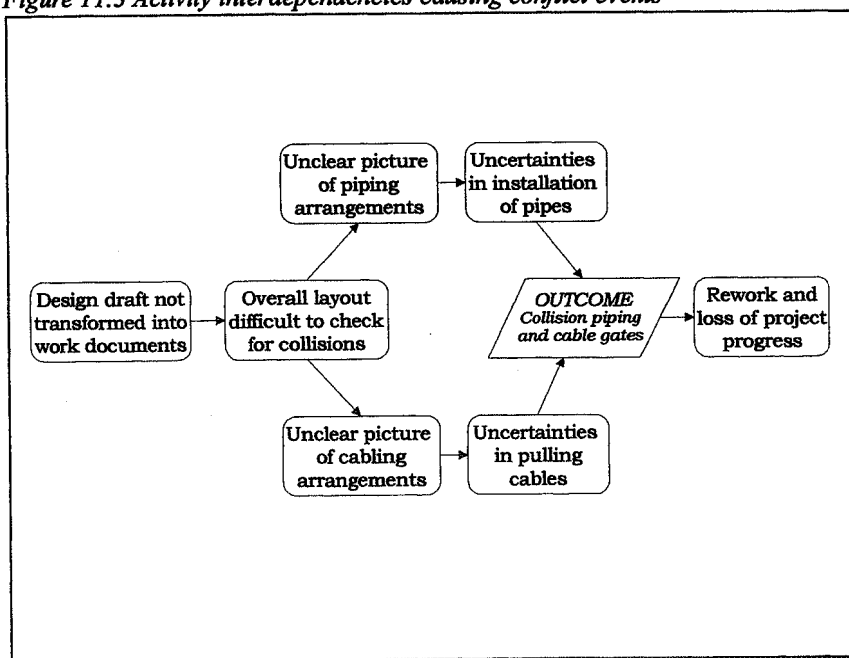
Figure 11.2 Distribution of interdependencies



The role of interdependencies:

The activity interdependencies in the Norne-project can be illustrated through the domino effect starting from the fact that design drafts were not transformed into detailed and formalized into working documents. This caused effect on the Yard's ability to install piping and cables, ending up in physical collision, rework and delay in project progress. The sequences are illustrated in figure 11.3:

Figure 11.3 Activity interdependencies causing conflict events

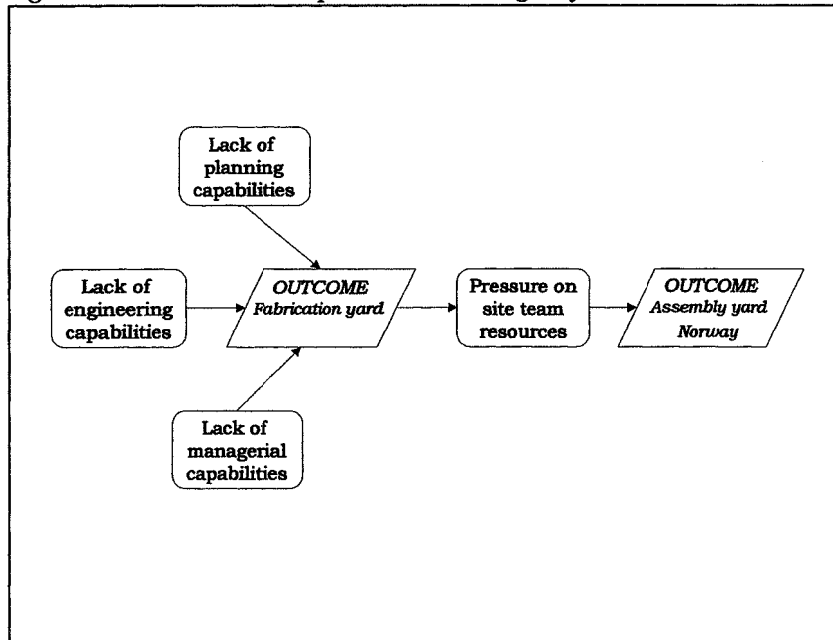


The activity interdependencies in a complex project context are further discussed in chapter 3. Whereas actor interdependencies will be discussed in relation to the phenomenon of third party involvement, the resource interdependencies is illustrated in figure 11.4:

Lack of engineering-, planning- and managerial resources causes a variety of problems related to quality at the yard. This puts a pressure on the site team (buyer representatives) whose main task is to safeguard the project progress and quality performance at the yard. Increasing quality and progress problems impose a control pressure on the team beyond their capacity level. As a consequence a large number of problems related to fabrication of the hull were transferred to the Norwegian assembly yard whose task it was to

merge the hull with the production unit on deck. This illustrates how resources are interdependent.

Figure 11.4 Resource interdependencies causing conflict events



The governance issue and types of interdependencies:

The variable analysis reveals a significant difference ($p=0,001$) in group means on the buyer side, but no on seller side. Whereas resource interdependencies show a relatively strong tendency towards the informal ($X_B=1,53$), the Actor-group are more inclined to be formal ($X_B=2,13$).

Why is resource independence more apparent on the informal side than actor interdependencies? Three arguments may explain this phenomenon. Firstly, the actors are highly specialized and need human resources from other parties to match their own resources. These resources, e.g. specialists, have to be motivated to cross functional- and corporate boundaries to exploit their resource potential. Secondly, resource flexibility is crucial in keeping project progress, and requires relational attention. Thirdly, actor interdependencies are more related to how company boundaries and interface are handled. These may easily cause financial implications thus triggering attention towards formal mechanisms. A typical example is events related to payment milestones.

Summing up, nearly half of the conflict events are related to activity interdependencies. In the project conflict in minor activities can easily initiate a domino effect leading up to severe and complex problems in the activity structure. This type of conflict has no significant relationship to either of the governance mechanisms.

11.3.2 Third party (3PRTY) involvement and the governance-perception

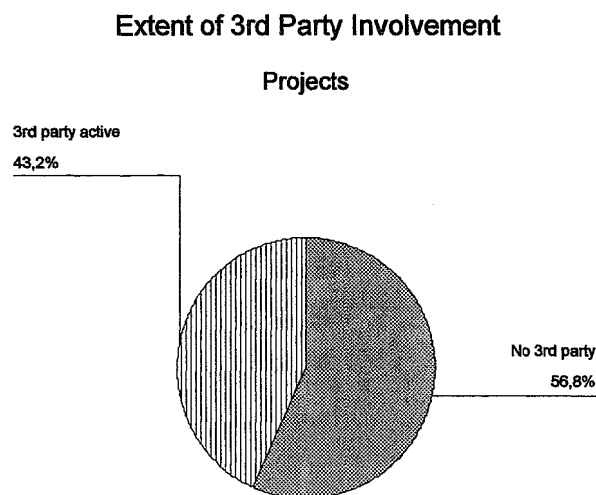
Q3 How does the existence of third parties involved in the buyer-seller dyad relate to the perception of the governance mechanisms?

In the following the events will be placed into the two groups, one containing the events influenced by active third parties, and the other without direct influence from parties outside the focal dyad. The frequency and role of third parties in relation to conflict events will be discussed, and found the basis for an analysis of third parties in relation to the governance issue.

The extent of third party involvement in the events:

Close to half (43,2%) of the events were webbed into the kind third party connections further described below. This is in compliance with the notion of interconnectedness set forth in network theory. A practical consequence of this is that close to half of conflict events are not governed solely by buyer and seller within the dyad, but interconnected with parties outside the dyadic relation.

Figure 11.5 Extent of third party involvement



The assessment of third party involvement has, however, some weaknesses. Firstly, involvement may vary along the time axis of the project. Secondly, short event descriptions entail the risk of misinterpretation. Thirdly, third parties can be hard to identify but have strong influence, and finally, third parties can be active, but are without significant influence. This implies that the extent of third party influence in dyadic decisions is a complex issue with reliability and validity constraints.

Third party's role in the dyad:

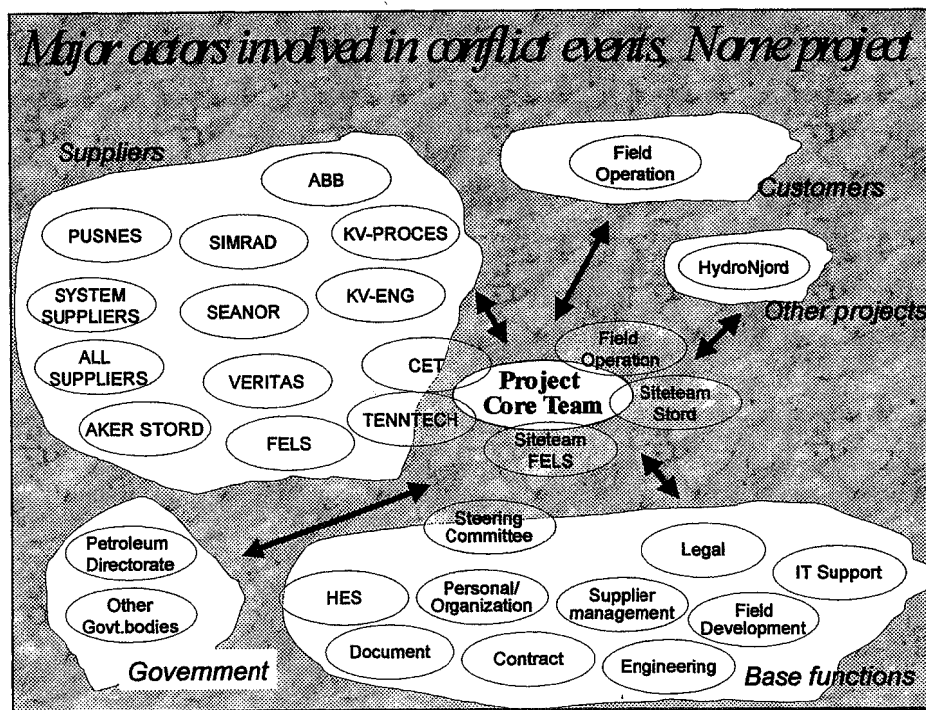
A third party is in this context defined as an internal or external actor playing a significant role in the dyadic relation. The third party can either enhance opportunities for the dyad or constrain these. In a project context I suggest the term "internal" third parties to include actors in the parties' base organizations, and other stakeholders within the buyer's or seller's own organization. These actors play a formal or informal role between the focal buyer and seller. Based upon empirical material from the two projects the following examples of third parties can be found:

Table 11.6 Third party's role in the dyad

Type	Category	Key items
Internal 3 rd party	Legal department in base organization.	Contractual strategy, Incentive- and penalty-system
	Engineering staff in base organization.	Field concept, Material and key technological issues
	Contract and procurement staff	Sourcing policy, Contractual strategy
	Project operational team	Layout, capabilities, life cycle cost, maintainability, operational issues
	Steering committee	Strategy for developing the field. Core technology, finance, and project management.
External 3 rd party	Other projects/companies	Claiming scarce resources of interest to the project
	Governmental bodies	Law and regulations and exemptions of these. Certificates and approvals
	Other suppliers to buyer	Technology development, cost structure, alternative solutions
	Other customers to seller	Claiming scarce resources of interest to focal buyer

Some third parties, such as the buyer's base organization, are more or less controlled by the buyer (e.g. project team). Others are more or less controlled by suppliers, such as their sub-suppliers. Some third parties act independently of control and influence from the buyer-seller dyad, such as governmental bodies. The crucial point is, however, that the existence of active third parties adds complexity to the buyer-seller dyad, which in turn influences on the effectiveness of governance modes. The complexity added through third parties can be further illustrated in the following actor chart based upon data from the one of the projects:

Figure 11.6 Actors involved in conflict events

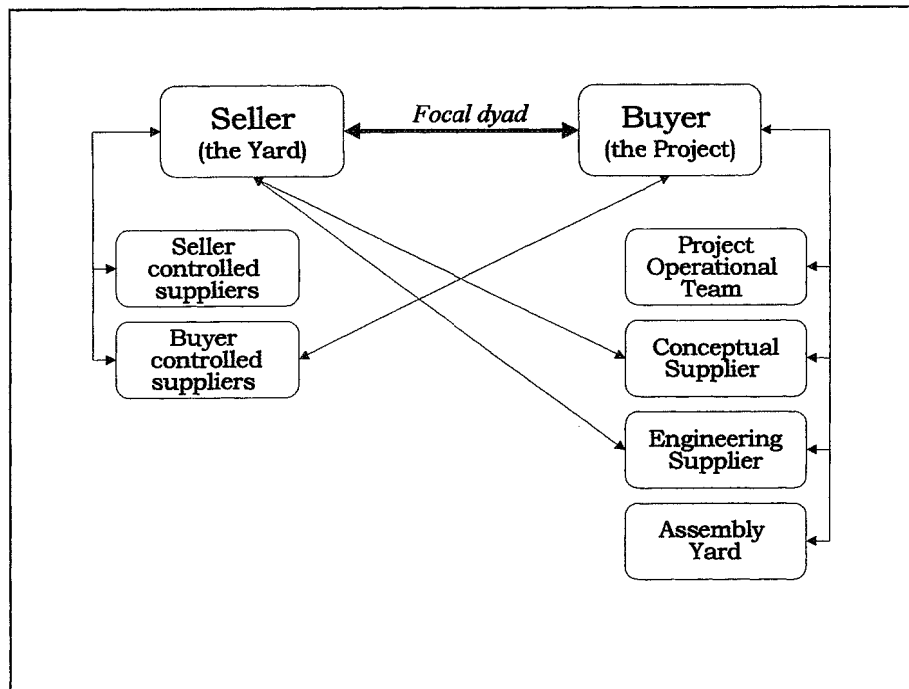


The picture, based on the Norne-project, is blurred because buyer and sellers are placed in the same organization as an integrated team, referred to as the project core team. This team is controlled by buyer, but is extended to include sellers in order to enhance creativity, flexibility and speed up the decision process. Both buyer and seller are thus strongly interdependent and furthermore constrained by their surrounding third parties. In this picture third parties challenge and add complexity to the focal dyads. Accordingly

the traditional buyer-seller dyad does not fully reflect the interplay and interdependencies among the actors.

Third parties influencing the focal dyad are numerous, and the empirical material clearly indicates third party involvement in the project core team after contractual/legal bonds have been established. These parties are either legal institutions such as the supplier of the concept, or intra-organizational entities governed by the superiors of the buyer such as the project's operation team. Some of the third parties are even governed partly by the buyer and partly by the seller, such as system contractors having contractual bonds to the buyer, but heavily constrained by factors determined by the seller. Other examples are the contractors (controlled by buyer) serving as sources to constraints and opportunities to the yard (seller). Some of the informants stressed that the buyer's field operation group and engineering contractor are among the most active third parties in the eyes of the seller and buyer. They furthermore claim that the decision room for project manager is constrained by engineering contractor. This group of third parties has so to say two parallel customers, the yard and the project, thus enhancing the technical and managerial complexity. This is illustrated below:

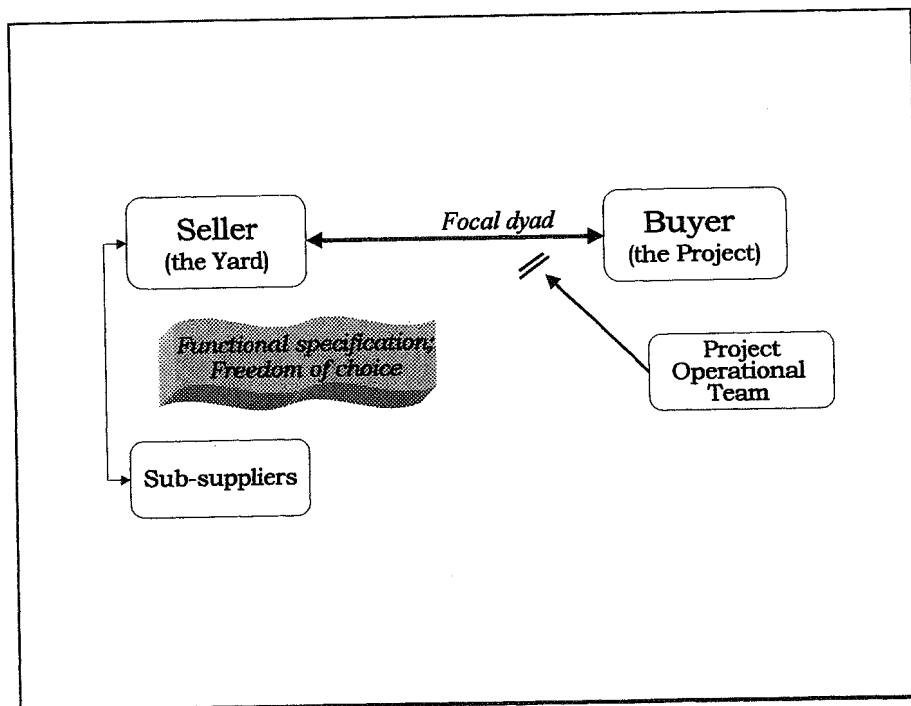
Figure 11.7 Third party interfering in focal dyad



The importance of third parties can also be illustrated through an example in which the third party is not invited to the arena. In the Norne-project future users of the production vessel were not involved in the project core team when concept and contracts were decided. This led to undesired consequences such as unstandardized technical solutions, which caused higher life cycle costs than necessary, poor access to operational equipment with future maintenance problems as result. After a few years of operation modifications of equipment and construction parts were required, possibly based on weak involvement from the operational team in the early phases of the project.

There was consent among the informants that a stronger operational team participation in the design/contract phase would have enhanced the outcome of the project with respect to functionality and life cycle cost. These are fundamental goals far beyond the goals of the fabrication phase of the project. The consequences of not involving the operational team in the earliest phase of the project were further enhanced by the use of functional specifications allowing a great amount of freedom for suppliers.

Figure 11.8 Project operational team as one of the third parties



The governance issue and third parties:

Whereas no significance is found on the buyer side ($p=0,077$), the group means of active versus non-active third parties on seller side are significant ($p=0,000$). When third parties are active the formal governance mechanisms are stronger ($X_s=2,99$) than in situations with weak or non-active third parties ($X_s=2,28$).

Events comprising third parties seem to be related to formal mechanisms. One rationale behind the relatively high formal governance can be that active third parties add complexity, which disturbs seller efficiency, and thereby call for rules, routines and predefined patterns of behavior. The governance mechanisms so to say protect the seller against intruders from the buyer's base organization, or from other "buyer controlled" parties. On the other hand, contracts and agreements are usually made between the main actors; buyer and seller, thus leaving the third parties outside the formal boundaries.

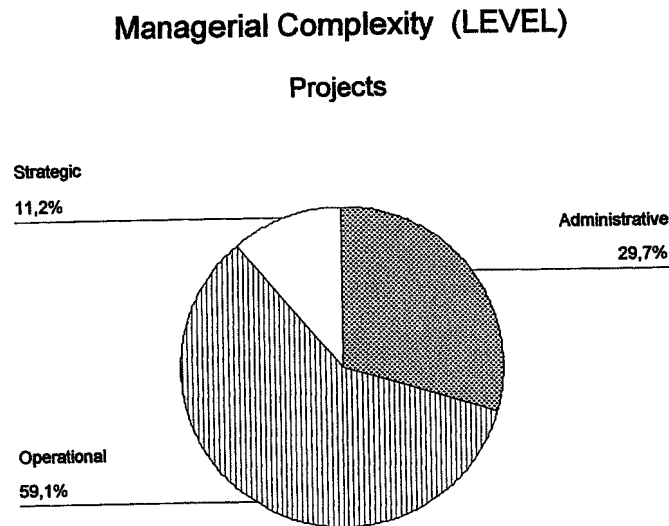
Summing up; I clearly see that active third parties do exist and play an important role both as a constraint and as a necessary resource in the buyer-seller relation. Secondly active third parties, at least as perceived by seller, call for a higher degree of formal governance, perhaps as a protection against disturbance. Finally, having active internal- and external third parties involved in nearly half of the conflict events one may ask: Who does really run the project?

11.3.4 Hierarchical level of the events (LEVEL) and the governance-perception

Q5 The conflict events are formed into groups characterizing association to strategic- administrative and operational level. How does these types differ in relation to formal and informal governance mechanisms?

The events were further classified into operational-, administrative- or strategic issues. As the following diagram illustrates the main group of events are operational. Strategic issues are limited to 11%.

Figure 11.9 Conflict events and hierarchical level



The hierarchical level of the events and the governance issue:

Both buyer- and seller sides reveal significant group differences ($p=0,000$ and $p=0,022$ respectively) indicating that events on the project-strategic level are more related to formal mechanisms than events associated with lower hierarchical levels. On the buyer side the strategic issues are $X_B=2,79$ compared to $X_B=1,79$ (administrative level) and $X_B=1,61$ (operational level). The same pattern applies to the seller side with $X_S=3,17$ on strategic level compared to $X_S=2,70$ (administrative level) and $X_S=2,42$ (operational level). These findings will be further discussed below.

One apparent finding is that events dealing with strategic issues are assumed to be more associated with formal governance compared to administrative and operational level events. This is in accordance with what I expect to find. In my discussion of actor bonds in chapter 3.5.3 I argued that CEO and top managers have a more relational focus than managers on administrative/operational level. There is probably a crucial difference between managers within the project and managers in the base organization with respect to attitudes towards strategic issues. I thus suggest that whereas strategic issues are less formal in the base organization, they are envisioned as being more formal in the project managerial team. This is, however, an issue that requires further research.

The operational events are the most relational. One reason for this is probably related to the great number of operational events (59%) which

prevents the possibility of developing formal mechanisms to cover the emergence of conflict.

Summing up, the most interesting is that conflict events related to strategic issues are perceived as more oriented towards formal governance mechanisms than lower level events. Assuming strategic issues as more important than other, this finding supports my previous finding that important events are skewed towards formal governance mechanisms.

11.3.5 Cultural difference on the seller side (CULTURE) and the governance-perception

Q6 What role does cultural distance play in relation to the governance mechanisms?

One of the three dyads in Norne was assessed by a South-Korean- and a Japanese team on the seller side. The remaining assessments were carried out by Norwegian informant groups. A comparison between the Asian team and Norwegian revealed no significant differences. There is, however, one important weakness. Even within the same project the dyads may be different with regard to types of events. Comparing different dyads is not an ideal way of investigating cultural differences and a possible extension of this study could be to put a Norwegian team to assess the similar events as the Asian. Recognizing this weakness I should be able to see differences more clearly if the cultural distance was evident.

The issue is, however, too important to draw a final conclusion based on my research design. Further investigation of cultural differences is proposed in chapter 17 (Further research) involving a more purposeful research design for this specific issue.

11.4 Concluding discussion, stage one

The purpose of this chapter was to answer six questions pertaining to the relation between conflict events and the governance mechanisms.

The first question raised was how the buyer and seller sides perceive the governance mechanisms in relation to the conflict events. This ended with three significant findings. Firstly, conflict events are significantly more associated with informal governance mechanisms than formal. In general both the seller and the buyer agree, and the parties thus enters the mutual informal zone in the governance grid. Secondly, the buyer/seller perceptions

separate more in the Norne-project compared with Siri. This can be explained by differences in the distribution of risk between the parties. Thirdly, the seller side seems to go formal when the degree of innovation and functional risk is high, which is expressed through the Norne-case. From the buyer's perspective it is opposite with a shift towards the informal side.

These findings have theoretical implications. One of the most apparent is that the industrial network approach (outlined in chapter 3.2) claim that the Firm is characterized by having no standardized exchange with its environment (Håkansson and Snehota 1995). The nature of the market process is influenced by social exchange found in actor bonds. The findings above support this in the way that events of conflict are strongly associated with informal governance mechanisms. In these mechanisms we find the "unstandardized" exchange free from operational procedures and predetermined patterns of behavior. On the other hand the interaction, from which the conflict events are derived, also include formal governance mechanisms according to our finding. This implies that the interaction, between the buyer side and seller side, also include elements of standardization. I will therefore argue that the business relationship in a complex project include a mix of standardized/formal and unstandardized/informal exchange processes, however, with an emphasis on the latter.

Through the second question I wanted to find out whether there is any relationship between perceived importance of an event and the governance mechanisms. Here I find a significant relationship between the importance of a conflict event and formal governance perceived from the seller side. The higher perceived importance, the stronger association to formal governance mechanisms. The lack of significant relationship on the buyer side is interesting, but can be related to methodological and conceptual weaknesses. At any rate, a large portion of conflict events originates from areas beyond formal systems, rules and planning.

According to network approach, the structures in relation to actors, activities and resources, are dynamic. A relevant question is whether these changes are imposed by planned and carefully managed processes, or mainly dominated by the sum of more or less independent micro processes. Structures are extremely important in a project, and embrace a large number of conflict events. The finding seems to support that important events, often related to structures, are planned. Even that this is only significant for seller side, I see no theoretical or any managerial reason why the buyer side should be different.

The remaining four questions addresses structural characteristics with the events, and relationship to the governance mechanisms. One of these is how the type of interdependencies characterizing the event is associated with the governance mechanisms. The most frequent one is the activity interdependencies, counting nearly half of the conflict events. In the project conflict in minor activities can easily initiate a domino effect leading up to severe and complex problems in the activity structure. This type of conflict has no significant relationship to either of the governance mechanisms. The theoretical implication of the finding is that the high frequent activity interdependencies are one significant characteristics of the interaction process in a project.

How does the existence of internal and external third parties relate to the governance mechanisms? I clearly see that active third parties do exist and play an important role both as a constraint and as a necessary resource in the buyer-seller relation. Secondly active third parties, at least as perceived by seller, call for a higher degree of formal governance, perhaps as a protection against disturbance.

The network approach claims that the actors control activities and try to gain control over the network. This is possible through actor bonds. One interesting question related to the findings above is what these bonds consist of in order to gain control. The existence of active third parties seems to indicate that the bonds between these and the focal buyer/seller include protective mechanisms found in the formal governance mechanisms. In other words one may suggest that the formal governance mechanisms are employed, by the focal actors, to prevent third parties to take control of the network.

Based on a classification of events in terms of hierarchical level, how does this relate to the governance mechanisms? The most interesting finding is that conflict events related to strategic issues are perceived as more oriented towards formal governance mechanisms than lower level events. Assuming strategic issues as more important than other, this finding supports my previous finding that important events are skewed towards formal governance mechanisms.

In the network perspective, what are the strategic issues? I believe that many of these are related to structures in the network. Through formation of activity patterns, web of actors and different resource constellations the identity of the actor is determined. The question remaining is whether these structures are planned or not. Assuming that the most strategic issues are dealing with structures, the findings seem to support that structures are

primarily based on planning and formal governance compared to non-structural issues.

Finally the importance of cultural distance was tested. A comparison between the Asian and Norwegian informant teams revealed no significant differences. On the other hand I am reluctant to conclude on this due to conceptual weaknesses. This issue is further discussed in chapter 14.2 where the qualitative part of the study clearly indicates the very existence of cultural distance in our type of business interaction. In chapter 17 a proposal for a new study of possible relations between cultural distance and the governance mechanisms is outlined.

PART 3, DESIGN AND ANALYSIS STAGE 2

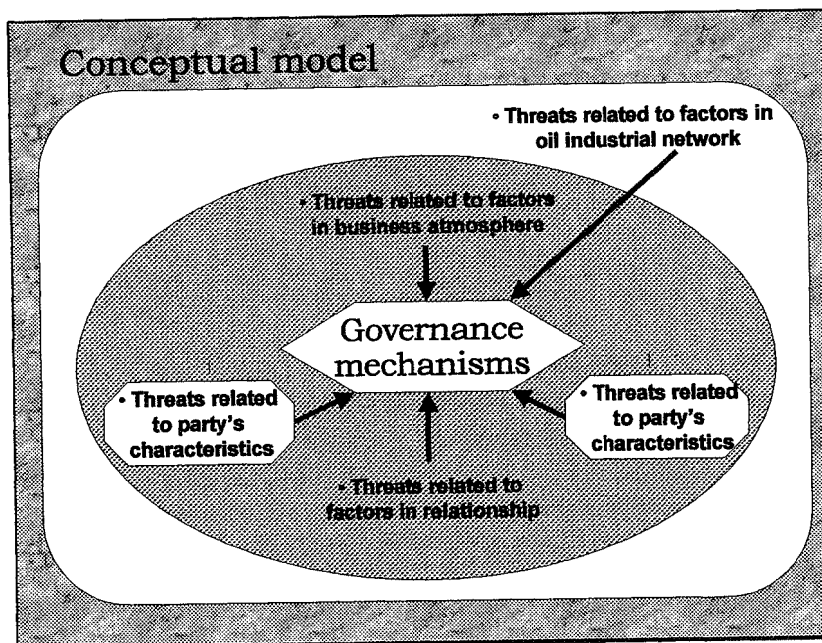
12. Conceptual model and research design

In stage one of the study I found that conflict events had a significant stronger association to informal governance mechanisms than formal. In this stage of the study I seek to explore informal mechanisms in terms of threats to the mechanisms. By identifying and understand these threats I know how to strengthen informal governance, and reduce the level and intensity of conflict in business relationships.

12.1 Conceptual model

In the conceptual model the threats to informal governance are organized along four dimensions: In the industrial network, in the business atmosphere of the project, in the relationship between buyer and seller, and within the buyer/seller organizations.

Figure 12.1 Conceptual model



12.2 Research design

12.2.1 Key informants

Informants were selected for validation and discussion of the finding revealed in the variable analysis. They were partly selected among project executives who have a broad and international perspective on buyer seller interaction within the oil-industry, and among lawyers with professional experience in solving business conflict phenomena. This goal was met by recruitment based on corporate and cultural diversity. None of the informants were involved as informants in stage one. See appendix 8.4 for further details.

Table 12.1 Informants applied in stage 2 of the study

Informant position	Company characteristics
CEO	Dutch offshore yard
Project director	Norwegian oil drilling contractor
Projects department manager	French oil company
Director/ corporate advisor	Oil industrial foundation for project & contract management/ Norwegian oil company
Project supervision specialist	Norwegian oil company
Chairman and CEO	Singapore shipyard
Project director	Norwegian drilling contractor in Singapore
Supreme court lawyer	Law firm, diversified client portfolio
Corporate lawyer	Law firm specializing in general business
Corporate lawyer	Law firm specializing in the oil industry
Corporate lawyer	Law firm specializing in the oil industry

12.2.2 Data collection

Data collection was based on semi structured interviews. In the initial phase of the interview informants were explained the findings in stage one of the study, and specifically the claimed importance of informal governance mechanisms. Furthermore, a description of the governance mechanism construct and a contextual description including the cases applied in stage one.

Nine interviews were carried out. Two of the interviews included two informants. The interviews lasted between one and two hours. A written report, based on handwritten notes supplied with tape records, was made the

same day. Interviews were based on questions set forth in appendix 11.2 and 11.3, in addition to a written summary of findings in stage one.

All informants had some experience in dealing with conflict phenomena related to oil industry and projects, and 4 informants out of 11 had specific knowledge of challenges and characteristics of the Siri- or Norne project.

13. Validation

The most relevant validation challenge is related to construct validity of the governance mechanism-construct (see chapter 9.1). One crucial question here is whether the interpretation of the construct is the same regardless of coupling to the conflict events or not. In the first stage informants were explained the construct's theoretical and empirical base and content prior to assessment. Their perceptions of the construct might subsequently have been colored by their interpretation of the events. During the assessment process, perception of the construct may thus have changed from the initial point.

In stage two of the study, the informants were explained the construct the same way as in informants in stage one. However, the interpretation of governance mechanism was colored by other factors than conflict events. Factors from the industrial network, business atmosphere, interaction and the parties may have an influence in how the two governance mechanisms are interpreted.

Summing up I believe there is a construct validity risk in changing the context of which the construct is applied. On the other hand, effort was made during the interview process to reduce this risk. Hence, the risk of significant threat to construct validity is limited.

14. Empirical findings, stage two

14.1 Introduction

Based on the preceding buyer-seller assessments of selected conflict events I have claimed that informal governance mechanisms are more important than formal when searching for the point of origin of conflict. One important question still remains to be solved, however. If strong informal mechanisms are important, what are the major threats to these mechanisms? This question is answered in terms of the constructs suggested in the interaction model (Håkansson 1982 and 1989): Characteristics with the industrial environment, with the business atmosphere, with the interaction parties, and those directly related to the interaction process.

The concepts and basic assumptions in the interaction model describe the interaction between buying and selling companies. The model's relevance to this study is based on the assumption that the governance mechanisms are integrated parts of the interaction between project actors. It is thus fruitful to apply the same framework for analyzing the threats to the informal governance mechanisms as interaction in a broader sense. The theoretical links between the interaction model and the threats to the informal governance mechanisms will be discussed under each sub chapter.

14.2 Threats from the oil-industrial network

Based on the discussion in chapter 3 the complex project is a part of an oil industrial network, and interrelated with this. This implies that interaction in which conflict takes place, is influenced by streams, values, and other external conditions in the surrounding environment. From this environment four factors seem to challenge the strength of informal mechanisms.

Firstly, the cultural distance between buyer and seller can play a role. Shared values are assumed to be more difficult to develop and maintain between e.g. an Asian seller and a Norwegian buyer than two local actors. This cultural distance is not necessarily related to broad traditional differences such as religion, rules of conduct in social life and language. General attitudes, understanding and consciousness of the business culture characterizing own company and the other, seem to be more important. This implies that cultural distance is not primarily a matter of geography, but rather an element describing the processes taking place in the industrial network. Asian

informants illustrated this by comparing two different types of Norwegian actors (representing two different industrial networks) in relation to selling yards, the traditional Norwegian ship-owner and the Norwegian oil-company. Whereas the first was characterized as flexible, empowered and proactive for reaching agreement, the oil-company was more bureaucratic, formalistic, and less reluctant to disclose information. This difference could stem from higher technological complexity in the oil-company, but the corporate culture was considered far more important.

My empirical material further indicates that cultural distance is not only formed in the dyadic relationship between buyer and seller, but that is highly influenced by third parties found in the industrial network. Asian informants illustrated this by arguing that a Norwegian supplier acted very differently to the Asian fabrication yard (customer) if the second tier customer (end customer) was a Norwegian rather than a non-Norwegian. A "Norwegian-Asian-Norwegian"- chain was found more stressful and tense than a "Norwegian-Asian-International" chain even for similar deliveries. This has at least two implications. Firstly, that the actor is formed by the network. Secondly, that the cultural distance between a specific buyer and specific seller may vary depending on third parties. Summing up; cultural distance and heterogeneity reduce the ability and willingness to strengthen informal mechanisms.

Secondly and closely related to geographical distance, is the country's history of internationalization. The Asian informants were all trading with buyers from different parts of the world, and argued that there is a significant difference in the role of governance mechanisms between nations with different extent of "multinational experience". Informants pinpointed this by addressing Norway's lack of multinational companies, and virtually no international historical tradition except for non-business areas such as active foreign politics and missionary activities, well isolated outside the European Community. Perhaps we have kept our global missionary role, but changed the subject from "eternal life" to "technology". Compared to Sweden, Denmark, UK and the Netherlands our international business experience and cultural humbleness were considered weak. How can then trust be developed? One can further argue that the background scenery to the business relationships is constrained by lack of cultural tolerance and humbleness, thus preventing us from applying and developing informal governance mechanisms.

Thirdly, industrial paradigms materialized in terms of e.g. "Norsok", "Miljøsoke" and "Kon-kraft" (OLF 2000) are examples of joint industrial initiatives to strengthen or change current managerial ideals among buyers

and sellers in the oil industry. These ideals can cross and even disrupt existing informal patterns of interaction that have evolved over several years in specific dyads. Some of the informants even claimed that e.g. Norsok, which was established to enhance industrial co-operation, eventually led to the contrary in terms of distorted trust and use of coercive power. Different Asian informants claimed that they were approached from buyer side by the good intentions of Crine and Norsok initiatives. Convinced by the buyer, the projects ended up as financial disasters for the seller and loss of trust. The seller's arguments can be summarized in the following statement: "Based on industrial ideals (e.g. Norsok and Crine) they launched functional specifications, supported openness for a "win-win"-attitude, and they acknowledged our ability and right to decide on details. After a short while they shifted from a supportive trust-based and informal strategy to a pure formal and legal strategy, and we lost control and our money". Some added that industrial paradigms are ideals that are not necessarily implemented in the practical project management. Competitive bidding based on pure technological- and economic factors can also suppress the long-term business relation quality necessary for the informal mechanisms to grow. Accordingly we can argue that relationships are dynamic and affected by the "language of the industry" (Håkansson 1989).

Forthly, the oil price plays a role. The lower the oil price, the more marginal the profitability and the more tension there is between the parties. This leads to formal governance on the expense of informal. The parties seek formal protection for fear of potential loss incurred by the other party. This coincides with (Håkansson 1989) who claims that the market structure in terms of concentration of buyer and seller, stability or rate of change of the market etc. are important environmental factors. One can therefore suggest that production limits imposed by OPEC impacting on the oil price have an effect on the interaction between buyer and seller.

Finally international competitive regulations may prevent close co-operation between buyer and seller, by imposing strong legal provisions to prevent national oil-companies from favoring national suppliers on the expense of an international supplier market. Heavy fines and legal sanctions may easily reduce the willingness to make relational investments (Statoil 1994).

The identification of five threats has relevance to the interaction model in several aspects. Håkansson (1989) addresses the influence of e.g. social system and internationalization on the relationship. Attitudes and perceptions on a generalized level can be important obstacles, and may effect the organization and motivations for both parties to develop the relationship further. This coincides with cultural distance and history of internationali-

zation identified as threats. The dynamism in the relationship and in the market is a third element addressed by Håkansson (1989). In my study changes in the industrial paradigms and rapid changes in oil price are examples of such dynamic elements affecting the relationship and the informal governance mechanisms. The theoretical links from the threats affecting the informal governance mechanisms to the environmental elements in the interaction model is therefore supported.

Summing up, I have identified five threats in the industrial environment embracing the buyer-seller relationship. Firstly, cultural distance between buyer and seller had implications in the way business culture was developed. Differences between the Norwegian "shipping culture" and "oil-industrial culture" in relation to international actors were suggested. Secondly, the nation's international trade history gave the Norwegian buyer's a drawback in improving informal mechanisms, because informality and trust presuppose experience. The third and fourth factors were related to industrial paradigms which sometimes disturb the informal fundament, and the oil price having effect on the tension and willingness to go informal. Competitive regulations were the final element challenging the long-term business relationship based on informal governance mechanisms.

14.3 Threats from the project atmosphere

In the atmosphere embracing the interaction at least three factors are particularly relevant related to the informal mechanisms. The first is related to the complexity of the entity being developed and fabricated, consisting of a large number of actor-, resource-, and activity interdependencies (see chapters 3 and 11.3 for further details). The risk of losing control calls for awareness and reluctance in relying on informal governance. Internal and external third parties add managerial and technological complexity and disturb efficiency. To reduce delays and cost effects, the parties seek protection through rules, routines and predefined patterns of behavior. Formal governance mechanisms thus function as a shield against unplanned interruption, but are on the expense on the informal mechanisms that are necessary to handle planning deficiencies.

The second argument is related to differences in mutual expectations of project owners, represented through the steering committee of the field, and the seller. A risk adverse attitude in the steering committee can easily favor protective mechanisms in terms of formalism and a legal attitude, even if some of its members (on the buyer side) have a more informal attitude. A

consequence is that the other party is considered as being opportunistic, and therefore approached through distinct procedures, rules and contract.

The final argument is related to time- and cost overruns and fear of losing control. A project with marginal profitability or a project with accelerating unplanned cost escalation will stress the parties and lead to formal governance on the expense of the informal. The seller side will anticipate a risk of losing money by an opportunistic buyer trying to reduce costs or stop budget overruns on the expense of him. The buyer on the other side will guard against exploitation from seller. Hence both parties feel the risk of losing money, and move away from a smooth relational atmosphere towards formal/contractual protection, regardless which party that really bears the risk of losing money. This emphasizes the state of conflict or co-operation as characteristic of the business atmosphere (Håkansson 1989).

What are the theoretical linkages to the atmosphere element in the interaction model? The model includes one dimension that supports closeness and one dimension to avoid closeness. Costs (e.g. transaction cost) can be reduced by closer interaction. On the other hand the parties may seek control over the counterpart to reduce risk and vulnerability by employing different types of power, which reduce the closeness. In my findings we see that complexity of the entity being built, and the risk of time- and cost overruns may challenge the closeness, and thus represent threats to the informal mechanisms. Accordingly the control dimension suggested by Håkansson (1989) are highly visible in the project atmosphere.

Summing up, the complexity of the entity being built in terms of endless interdependencies was one threat. A second threat was differences in mutual expectations, particularly between steering committee and the buyer. Finally, time and cost overruns in the project caused a significant threat to reliance on informal governance when facing conflict.

14.4 Threats found among the interaction parties

This group embraces both attitudes and characteristics of the parties. These parties can be referred to on two levels, the personal/individual level or the company level. Five causes of weak informal governance mechanisms are suggested. Firstly, managerial reluctance to relational investments reduces the fundament for building informal governance. As long as e.g. the buyer relies on competitive bidding the future profit from making concessions is very uncertain for seller. The buyer may be reluctant to invest in seller competence because in the next licensing round, and following project, the

company may not be granted field operation responsibility. Investments in building ties to specific suppliers may therefore be interrupted by other buyers.

The buyer usually acts on behalf of a consortium having the government license to develop a field. This limits the buyer's freedom in choosing strategic suppliers to benefit from prior relational investments. The payback in developing a smooth and thrust based business relationship is therefore further complicated.

Whereas relational investments are focused on a limited number of actors, the focal buyer-seller dyad has many other similar ongoing relationships on a personal and company level (Håkansson 1989). Hence relational investments are so to say diluted, with consequences for the informal mechanisms.

Reluctance to relational investments can also be based on a general fear of being fooled. This can be illustrated by team-building initiatives from the buyer side aiming at enhancing social interaction between the parties. Some of the seller side informants even expressed a general reluctance to participate because of past experience with swapping informal information with the buyer side. As a metaphor one can question: "Who would join a lively follow-on party if you have reason to believe that someone has a hidden tape recorder?" This reluctance can also be related to a fear that the opposite party will change interaction strategy from a highly relational and informal to a highly formal one during the project. The buyer may for example act informal and acknowledge the competence in the seller's organization to keep the seller price low. By granting the seller freedom within e.g. functional specifications, buyer can switch strategy and demand specific high-cost technical solutions based on new assumptions and contractual "escape routes" found during the project. The seller side, on the other hand, may act "relational" and flexible to get the contract, and thereafter secure profitability by going highly formal in terms of claiming detailed variation orders and unnecessary firmness of principles.

Summing up; all prior knowledge suggesting that the other party will change governance mechanisms will reduce the willingness to make relational investments at a later stage.

A second argument is related to change of company representatives during the project phases. The lawyer informants argued that the ingredients to conflict and acceleration of conflict were often related to this lack of continuity in social bonds between the parties' representatives. Some of the Asian informants suggested different thresholds for calling in "help from

above". Whereas an Asian project staff are expected and required to solve "own" problems at the place of origin, the Norwegians seem to involve a well developed base-organization including corporate lawyers. This view can be supported by the Asian fear of losing face and the fact that their base organizations are smaller and less influential compared with those in Norwegian oil companies. Hence the number of vertical contacts are different.

This does not only pertain to knowledge of conflict details per se, but even more important individual perceptions and judgement based on informal information. Hence a high turnover or rotation of key personnel breaks up lines of history and reduces the possibility for building informal mechanisms dependent upon trust developed over time. This phenomenon is also addressed by Håkansson (1989) who claims that varied personalities, experience, and motivations of individuals, imply that they take part in social exchange differently and judge conflict events differently. This further implies that business exchange processes are highly influenced by social bonds that take time to develop.

The third cause claimed by my informants is related to the willingness to apply power differences between the parties, regardless of the relative strength. An uneven distribution of power in terms of size, skills and financial strength between the parties, combined with perceptions of arrogance are elements that disturb the informal mechanisms by destroying mutuality and shared beliefs. It is suggested that e.g. a large and powerful buyer relative to seller may create a seller fear of being exploited in "unregulated" areas. This reduces the willingness to rely on informal mechanisms from the less powerful side.

The fourth argument, closely related to the second and third argument, is that lack of formal authority and a clear assignment among the party representatives disrupt trust and increase fear of losing by internal third party interference (see chapter 11.3 for further). The lawyers argued that lack of assigned power and authority by party A representative causes party B to reject reliance on informal mechanisms. Why trust the other party's representative when this can easily be overruled by a principal?

The last argument deals with individual characteristics of the representatives where advanced age, homogenous educational/professional experience and human pride/prestige were all ingredients that reduced the ability to strengthen informal mechanisms. Some of the experienced lawyers expressed this by referring to the communication problems with the

inexperienced, ambitious lawyer powered with a top law degree and the experienced "all-rounder" managing a complex set of actors and activities. How can then informality be established?

It is suggested that older and more experienced project officers are more conscious about the pitfalls when it comes to trusting the other party, more reluctant to wave formalities and contractual details than younger. The Asian informants addressed the existence and willingness to apply "escape routes" when facing problems as one crucial individual characteristic. Individuals known for an ability and willingness to solve problems without calling for superiors will tend to improve the role of informal mechanisms.

What is also interesting here is the question of combinations across the dyad. What kind of combination of personal characteristics should the seller have in relation to the buyer in order to strengthen informal mechanisms? Is similarity or dissimilarity desired? These questions are not answered here but suggested as future research questions. What I probably can argue is that the central person's set of attitudes, competence, interpretation skills etc. play a significant role in how the informal governance mechanisms are utilized and developed.

Technology is one further characteristic of the parties affecting the interaction that could be added with reference to (Håkansson 1989). The interaction aims at tying the production technology of seller to the application technology of the buyer, with the characteristics of technological systems providing the basic conditions for the interaction (Håkansson 1989). This influence on dimensions of interaction processes such as requirements for adaptations, mutual trust and contact patterns. The question is to what extent these differences play a role in the development of informal mechanisms. In my study the complex projects were compared to a low technology "non-project" (see chapter 11.1 for further) with no significant differences in informal governance importance. I therefore find no support for suggesting that technological characteristics are a source to informal governance threat.

In addition to technology, three other elements related to interacting parties are set forth in the interaction model. The first addresses organizational experience and the parties' willingness to commitment. One can argue that the threat identified as the managerial reluctance to make relational investments is based on organizational experience. The second element in the model addresses the effect of the individuals. Varied personality, experience and motivations imply that the individuals take part in the interaction differently. This is related to two types of threats to the informal

mechanisms; the individual characteristics, and the changes of company representatives during the project phases. A third source to changes in the interaction is organizational size, structure and strategy. Large firms with large resources have a higher possibility to dominate the small one. This is related to the willingness to apply power differences as a threat identified in my study. The identified threats to informal governance mechanisms are thus closely related to the characteristics of the interaction parties affecting the interaction between the project's buyer and seller.

Summing up on threats caused by characteristics of the parties I have identified five areas of particular interest. The first is related to reluctance to make relational investments, caused by e.g. expected discontinuity in future relationship. A second factor is related to instability in the actors' representatives, illustrated by e.g. change of company representatives when dealing with problems. The third addresses the parties' willingness to apply relative power differences. Unclear formal authority and ambiguous assignments are related to the fourth factor. Finally, individual characteristics of the company representatives included a range of threats to the informal governance mechanisms.

14.5 Threats found in the interaction process

The most crucial element here is lack of history in the interaction, both on the individual as well as company level. As long as informal mechanisms are based on trust, time and duration in the interaction are necessary. A long history and lengthy business relation build the ingredients necessary for trust and mutual commitment. In such situations the tendency towards the occurrence of formal association with conflict events in the dyad diminish. Lack of trust leads to the corporate lawyers, trust keeps them out. Trust is also related to personal qualities such as technical/relational competence among project staff members. This emphasizes the importance of previous experience, mutual evaluation and the associated relationship between the companies (Håkansson 1989). This is related to a second argument, the experience and content of previous history. Elements of bad experience and perceived opportunism by the other party put informal mechanism on a hold.

Summing up, the history of the interaction plays a role primarily because willingness to built trust is strongly associated with past business experience.

14.6 Concluding discussion, stage two

In the industrial environment/network I identified cultural distance between buyer and seller as one factor. This is closely related to the nation's trade history and prior experience in handling international business affairs. Industrial paradigms are regularly introduced, and sometimes these interfere with informal pattern already established. The oil price has an effect on the risk for financial loss in the project, with consequences for willingness to go informal with the other party. Finally competitive regulations may disturb long term relationships and thereby limiting informal governance.

The second dimension is the business atmosphere embracing the relationship. Three factors were addressed. Firstly, the technological- and managerial complexity of the entity being built, secondly, differences in mutual expectations among internal and external parties, and thirdly, time and cost overruns in the project.

In the third dimension characteristics of the actors were addressed. The first of these is related to the buyer's or the seller's reluctance to make relational investments. Instability among the actors' representatives and change of key personnel are sometimes applied as escape-routes when conflict occurs. A third factor addresses the parties' willingness to apply relative power differences. The fourth factor addresses ambiguous assignments held by the representatives. Finally, the individual representatives comprise a range of characteristics having effect on willingness and ability to develop and apply informal governance mechanisms.

The final dimension, the characteristics of the interaction process, addresses specifically the history of the interaction because willingness to built trust is strongly associated with past business experience.

The study of threats to the informal governance mechanisms has revealed 14 different threats. These are related to the framework in the interaction model. By comparing the elements in the model with the threats we see similarities. The threats to informal governance mechanisms are also elements affecting the interaction and business relationship. One can therefore conclude that the findings support the majority of elements set forth the interaction model.

PART 4, CONCLUDING PART

15. Implications

15.1 Theoretical Implications

The project, its market processes, and market behavior can be understood in terms of traditional economics- and resource based theories or in terms of the concept of industrial networks and business relationship (e.g. Håkansson and Snehota 1995). I have applied the latter, which implies that the industrial network approach and the interaction model from which the first is derived. My findings confirm several of the propositions set forth in these frameworks, which will be discussed in the following.

According to the first finding, informal governance mechanisms are found more important as source to conflict than the formal. All three cases ended up in the "mutual informal zone" of the governance grid (see figure 11.1). This coincides with the network approach where structures of customer-seller relationships are characterized by a high extent of informality and informal bonding (Håkansson and Snehota 1995:8). The theory furthermore claims that the interaction processes within the relationship are built up of social exchange processes. Based on the empirical findings one can therefore claim empirical support for this view.

The same finding also reveals that formal governance mechanisms are highly apparent in the project relationships. The network approach addresses routinization as one process characteristic. Over time informal and complex business relationships ".tend to become institutionalized in terms of routines, explicit and implied rules of behavior, and rituals..", (Håkansson and Snehota 1995:10). In this study I find support for the existence of formal governance, but I find no evidence that the importance of this increases over time. Comparing the two time limited project cases with the continuous base-operation case we see no significant differences with respect to importance of the routinization/formalization aspect. One may therefore argue that importance of formalization is highly influenced by other elements than time and experience since even "new" project relationships seem to possess significant portions of formal governance elements.

The importance of formal versus informal governance mechanisms in the interaction processes can also be discussed in terms of exchange processes characteristics. As discussed in chapter 3.2 the firm is characterized by having no standardized exchange with its environment. Exchange is further

formed through actor bonds based on the identity and character of actors highly influenced by other actors in the network (Håkansson and Snehota 1995). Our findings (in stage one) support this in the way that conflict found in the interaction is highly related to informal governance mechanisms. At the same time we also see that formal governance mechanisms are also highly apparent when facing stress in the interaction. The formal mechanism embraces contracts, standard operational procedures and systems that highly form the interaction, and the actor bonds. The finding even support that the most important events and strategic issues are related to formal mechanisms (see paragraphs below). A highly relevant question is whether the network approach put too heavy emphasis on the relativism and social aspects of actor identity on expense of cool and faceless contract law and formal bindings found in the complex project. The actor bonds between buyer and seller, and hence the interaction processes, seem rather to be formed by a combination of formal and informal actor bonds. Hence social perception of trust and confidence, and formal arrangements seem to shape the relationships in the complex project.

The second major finding was that important events tend to be related to formal governance mechanisms. In other words, formal bonding seems to be more important when the most important issues are addressed in the relationship. This issue is hard to find in the theoretical framework, which suffers from clear propositions in this matter.

A third finding was related to the role of third parties in the project. The project is strongly interdependent with the surrounding world labeled the "oil industrial network". In this network third parties are identified, some of them from outside organizations but also many internal third parties are playing a significant role. I have indications that active third parties possess resources of value to the project, but at the same time they increase the stress in the dyadic relation between buyer and seller. This stress releases counteracting forces in terms of formal governance mechanisms. The existence and importance of third parties fully coincides with the theoretical framework which claim that companies cannot unilaterally control and decide the development of relationship. This calls for awareness of the interdependencies in the surrounding network.

The study supports the relevance and importance of interdependencies between actors, resources and activities. These are all parts of the structural characteristics of a business relationship set forth by the theory. In these interdependencies we clearly see a complexity more or less impossible to handle without loose connections and informal bonding.

Finally the findings in stage two of our study generally supports the elements characterizing business interaction in the interaction model. We identified 14 threats to informal governance mechanisms, corresponding with the theoretical emphasis on informal bonding. The theoretical implications were specifically addressed in chapter 14.5.

Summing up, I find support for five of the propositions set forth in the theoretical framework. First, a support for the informal bonding in business relationships and importance of social exchange process. Secondly, routinization and formality is a part of the economic dimension of the relationship, although this is not necessarily a function of time and experience in the relationship. Thirdly, the relationship consists of "no-standardized" exchange processes, well supported by the importance of informal governance mechanisms. Fourthly, the appearance and frequency of third parties give support for the view that one cannot unilaterally control the relationship. Fifthly, the notion of interdependencies in the relationship is fruitful and relevant explaining the loose connections characterizing complex project interaction. At one point my findings tend to differ from the theory in the way that the claimed "no standardized" exchange process seem rather to be a mixture of one informal, no-standardized form of interaction, and one formal and standardized form in terms of contracts and highly formalized rules.

15.2 Methodological Implications

My study has five major methodological implications.

Firstly, the study was designed in two stages. This choice was based upon two different sets of research questions that led towards two different research methodologies. In the first stage a variable analysis of conflict events was made upon perceptual assessments of conflict events in relation to two governance mechanisms. In the second stage, findings derived from variable analysis were used to disclose the threats to informal governance mechanisms. This phase was successful because the quantitative approach opened doors to important key informants on a high managerial level. These informants provided a deeper understanding of the sources to conflict than possible through a variable analysis approach.

Using two different scientific methodologies is challenging. These methods were based on different epistemological and philosophical underpinnings in terms of the hypothetical-deductive method and hermeneutics. Some may

argue that to utilize this combination is to draw the line too far as regards methodological flexibility, even in an exploratory study.

One important implication of the variable analysis is to draw precise and consistent boundaries around the constructs and variables. In my study this has not been easy, since I have applied a theory that supposes that all boundaries are arbitrary and that mutual interdependencies characterize the business-to-business interaction. A second challenge by applying both a variable analysis and a qualitative approach in the same study is that neither of them follows the pure methodological ideals characterizing each of the methods.

The second implication is related to my use of the conflict event construct. This implies that I have suppressed the long-term chain of events and strengthened the day-to-day, short-term events in my exploration of emerging conflict. Whereas the major contributions in research of conflict in marketing channels, and studies of business relations seem to apply a more aggregated perspective, I have applied a micro perspective on the phenomenon.

A third implication is that I have focused on perceptual issues from both the buyer- and seller positions for the same event. I acknowledge, however, that the buyer and seller may have different perceptions of the events per se, and the interpretation of the related governance mechanisms. Hence the events are not assumed to be identical. In doing so I address conflict as a perceptual issue. The perceptual issues were tested for perceptual characteristics and structural characteristics.

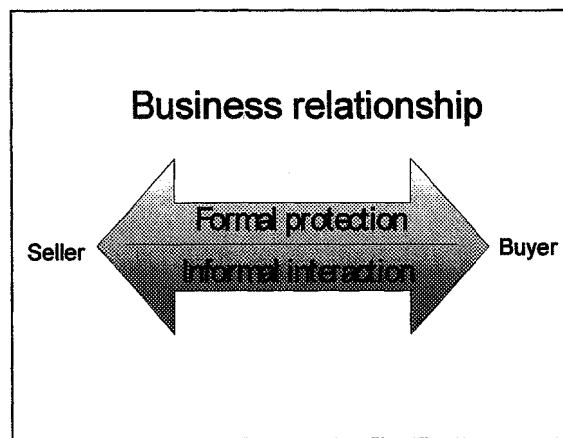
The fourth implication is related to the variable analysis, where the governance constructs are constrained by single measurements that limit validation efforts. In a next study I would put more efforts into development of testable constructs prior to application of these.

In the fifth implication is that the industrial network approach is applied as the main theoretical frame of reference, without really doing a full network study. By focusing on the dyad, I have limited the framework to only two parties and thus not fully utilized its potential. On the other hand the dyad is related and interpreted in terms of the network of which the dyad is a part.

15.3 Managerial Implications

The major finding in this study is that business relationship put under pressure, materialized through events of conflict, contains two intertwined mechanisms: Formal and informal governance mechanisms. To put it simple the formal governance mechanisms represents formal protection towards exploitation from the counterpart and third parties, and safeguard the economic dimension in terms of e.g. operational efficiency. The informal mechanisms represent interaction based on social exchange and the "human factor" when facing technological and managerial uncertainty. This is illustrated in the following figure.

Figure 15.1 Formal protection vs informal interaction



The study of three cases has revealed that informal interaction is more important than formal protection when understanding relationships under stress. This has a range of managerial implications.

Firstly, knowledge of how the actors perceive events of conflict in the buyer/seller interaction is valuable information and should be saved and made available in order to enhance existing and new business relations. Systems for monitoring and retrieving relational information should be developed in order to follow up development in the most important relationships over time.

This type of information can be illustrated through the following statement from on of the seller side informants:

"Based on industrial ideals they launched functional specifications, supported openness for a "win-win"-attitude, and they acknowledged our ability and right to decide on details. After a short while they shifted from a supportive trust-based and informal strategy to a pure formal and legal strategy, and we lost control and our money".

Seller informant

Secondly, contracts, standard operating procedures and so forth are not unimportant, but should be supplemented with systems to keep track of relational investments made by the parties. This is particularly interesting in the pre-qualification- and tendering processes where "objective" criteria are stressed on the expense of prior relational investments made by both parties. Good business relationships depend on relational investments made by the parties over time. And similar to other types of investments these can only be profitable by professional follow-up.

Thirdly, the importance of informal interaction has implications for the recruitment of project staff. Firstly, one should avoid too large discrepancies of personality and individual characteristics between buyer and seller. Secondly, flexibility should be supported by a pluralistic recruitment policy to projects, by hiring personnel with a multi cultural background. Personal characteristics were discussed in details in chapter 14.4.

The fourth implication is that conflict is not necessarily dysfunctional and to be avoided. Mechanisms should be further developed in order to benefit from conflict in terms of new solutions and pattern of resource- and activity combinations. In chapter 2.3 I argued that the "functional conflict" is desired in terms of sustaining necessary innovation, creativity and long-term value creation. Stagnation and inertia is therefore undesired side effects of removing conflict. On the other hand a large number of conflicts are highly "dysfunctional", and should be reduced to a minimum. By improving the informal interaction the dysfunctional side of conflict can be limited and in the next support cooperation and project efficiency.

The fifth implication is that the buyer's influence on the dyad is dependent on the seller and third parties, both in terms of making resources available and terms of defining the parties' decision room. Suppliers cannot be controlled, directed or fully managed. Interorganizational conflict thus cannot be avoided by means of predetermined patterns of behavior, detailed contract or other formal arrangements, but through development of sound informal business relations supported by a flexible formal arrangement.

Finally, the threats to informal interaction are not solely determined by the parties. Important elements are found in the atmosphere embracing the parties, and in the surrounding oil-industrial network. The conflict should therefore be interpreted in a wider context than the dyadic relation between the two parties. This is illustrated by one of the experienced project manager claiming:

"If seller or buyer loses money during the project, every participant will be affected, regardless of who is responsible".

Asian project manager, 27 years of project management experience

A summarizing conclusion can be sharpened into the following: A complex project should meet its challenges by improving the informal interaction, including the "human factor", on expense of formal protection.

"We French spend a lot of meeting time in social chat far away from the objective of the meeting, but we always reach a conclusion in time. You Norwegians are nicely prepared and decisive. During the meeting you spend all the time defending your standpoint, but you fail to reach the conclusion".

Vice president of a French oil company to his Norwegian subordinate.

16. Limitations

Any study implies limitations. Some are related to theoretical considerations or to choice of methodology and epistemological challenges, others concern practical research design and application of constructs. In this study some of my choices are balancing on the edge. Nine of those are discussed in the following.

Firstly, validation measures are weak and are limited to a qualitative assessment due to lack of multiple indicators. Consciousness and awareness regarding validity challenges helps, but is not sufficient for a good variable analysis although I have arguments supporting composite constructs.

Secondly, the industrial network approach is applied as a theoretical frame of reference for understanding the complex project. Nevertheless a dyadic approach is applied in the variable analysis. Referring to the importance of third parties doesn't transform a dyadic study into a classic network study, although I argue that the dyad is interrelated with the surrounding oil-industrial network.

Thirdly, two different basic research questions have been approached through two methodologies following two opposite epistemologies and knowledge philosophical archetypes. An explorative study opens for flexibility, but has this flexibility gone too far? In the study contextual importance is stressed although I apply the same governance mechanism-construct across the methodological gap. I thus admit that my choice can be controversial.

Fourthly, the buyer-side informants are exclusively recruited from Statoil, whereas seller side is more diversified. This is a clear limitation even though they represent different areas of a relatively large company. The fifth pertains to the issue of generality. With only two projects (supplied with one non-project as contrast) embracing five dyads, the findings have limited generality beyond the cases in a statistical sense. On the other hand I have a large number of observations (738), and key informants (31).

The sixth limitation is related to the definition and assessment of conflict events. Exploring conflict based on isolated events without relating these to a broader context implies a risk of suppressing the synergic effects in combing different events. A combination of two conflict events may e.g. outbalance or neutralize each other, whereas two other events of low importance may by coincidence explode into a large conflict when occurring at a specific time and place. The seventh, the informants didn't have the same

knowledge about the projects from which the events were derived. This was evident when the Asian informants assessed events from projects they did not know the identity of. The eighth limitation pertains to the time level. Based upon snapshots of completed projects I miss one crucial element in exploring conflict, the dynamics features of conflict.

The final limitation regards the use of the industrial network approach as a theoretical frame of reference. One of its weaknesses, as discussed in chapter 3.1.4, is the relatively low generality and precision. This limits falsification opportunities, and makes it difficult to determine areas where the findings do not support the theory.

Through the nine limitations I admit weaknesses in methodological choices and research design decisions. Awareness and humbleness in my claim of knowledge is therefore highly appropriate.

The rationale behind a seaplane is a relevant metaphor to the limitations above. A seaplane is neither an ideal flying machine nor a superior boat, but its combination is superior for the right missions. Following this argumentation, I still argue that without taking the liberty to challenge methodological ideals the constraints can be so extensive that certain phenomena remain unexplored. This implies that the limitations discussed above are not strong enough to prevent us from claiming that I have gained additional insight into the sources to conflict in a highly complex environment.

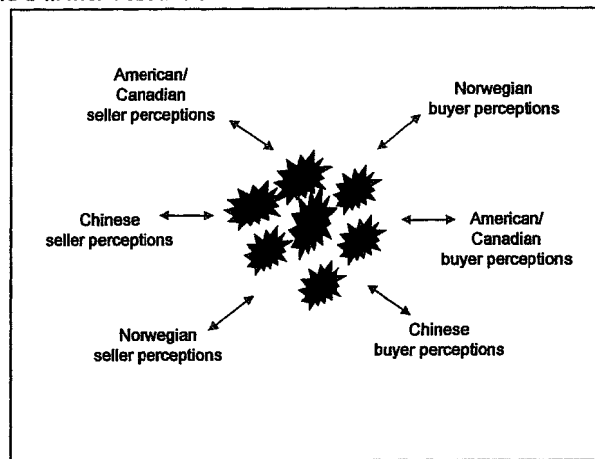
17. Further research

One of the research questions spelled out in chapter 5.1 addresses the role of cultural distance in relation to the governance mechanisms. The CULTURE-variable was introduced and categorized into one "Norway"-group and one "Korea/Japan" group. I found no significant differences between the groups with respect to association to formal versus informal governance mechanisms. There are, however, two major reasons for investigating this issue further. Firstly, the events assessed by the two groups were not identical, which is a research design weakness. Secondly, the stage two of the study revealed support for cultural differences between the Norwegians and foreign actors, regardless of being in a buyer or in a seller's position. I therefore propose a follow-up study based on the following:

The research problem is to identify differences and similarities in interpretation of conflict events across group of different business cultures. This could be based on a number of conflict events derived from either specific cases or from more generic sources. The context should be focused to complex fabrication projects, perhaps, but not necessarily related to the oil industry.

The study should be based on the two sets of governance mechanisms applied in this study, and involve perceptions of conflict events from both buyer's and seller's side. Informants could be arranged into the following groups:

Figure 17.1 Further research



The sets of informants are assumed to represent a cultural diversity with regards to association between conflict events and the governance mechanisms. The strong contractual and legal focus characterizing American business interaction, the strong Chinese *guanxi* (informal connection) and the Norwegian "in between" form of business interaction will provide empirical variety. Since the conflict events are the same for all informant groups, the study opens for a variety of comparison possibilities through statistical treatment.

The study should focus on the dyadic relationship, but the events should reflect the very existence of active third parties. This implies that the projects, of which the conflict events are derived, are interpreted in terms of the industrial network approach.

The proposed study should furthermore follow stringent statistical procedures by e.g. introducing multiple indicators of the governance mechanisms. This will open for proper validation tests.

Based on the findings in the second stage of my study, I find some support for cultural differences regarding the importance of informal versus formal governance mechanisms when conflict events are assessed. Thus a relevant hypothesis would be that the importance of e.g. informal governance mechanisms is determined by cultural factors. In other words, the importance of "human factor" is different when facing "within-industry-conflict-events" across nations.

My study could also give a lead to other types of studies by altering the methodology, but still remain within the concept of conflict events. Other researchers could e.g. explore projects in other contexts outside the oil industry or follow an ongoing project in order to reveal the dynamic features of conflict in a longitudinal study. I have investigated relatively financially successful projects. These are easier to approach when applying key informants. An interesting study could then focus on projects that ended up as financial disasters for one or both parties. This could bring in new knowledge about the relation between the project atmosphere and the perception of governance mechanisms. Finally a study could focus on the functional conflict, and how conflict is used as a vehicle for enhancing effectiveness.

18. Conclusion

My study ends with the following conclusions:

Informal governance mechanisms are very important in understanding why conflict develop and are solved, and more important than formal mechanisms. Both the buyer and seller place conflict event on the informal side of the 3,0 midpoint on the formal versus informal continuum.

The buyer is more informal in the governance issue than the seller. The parties differ in the mix of formal- and informal governance mechanisms, at least under complex circumstances where technology and organizational solutions represent uncertainty. In the "innovative" Norne-project, the buyer seems to have a more relational attitude than the seller. In a broad sense, however, the perceptual differences are low, which leads to the conclusion that both parties are relatively balanced in their perception of the informal mix.

Conflict has to be understood through the combination of mixed forms of governance. This implies that relational mechanisms cannot fully substitute formal mechanisms but have to be carefully managed in combination.

There is no evidence that certain structural characteristics give a bearing towards the degree of formalism in governance mechanisms. The most important issues, e.g. strategic issues, have a tendency towards formal mechanisms compared to others. The broad picture is, however, that the importance of relational awareness is represented in all types of complexity and managerial challenges in the complex project.

There is no relationship between the buyer's perception of governance mechanisms and buyer's perception of event importance. Hence both formal and informal mechanisms are relevant for understanding the most important events. There is a relationship, however, between the seller's perception of governance mechanisms and seller's perception of event importance. The most important events have a larger extent of formal mechanisms than the less important events. I find no obvious reason for this difference with regards to event importance association to the governance mechanisms.

Conflict in complex projects represents a broad range of interdependencies, interfering third parties and different managerial challenges. This reveals a great complexity that makes it difficult to manage by means of predefined formal mechanisms. A solution to this is to focus on situational awareness and strengthening social interaction between the buying and selling parties.

Active third parties seem to drift the parties towards formal governance mechanisms in order to reduce interference and loss of efficiency.

The threats to informal governance mechanisms were identified along four dimensions. First within the business environment dimension, where the geographical distance between the parties, prior history of internationalization, industrial paradigms and oil price were critical threats. In the second dimension, the business atmosphere, overall complexity of the entity being built, distribution of power, steering committee attitudes and time/cost overruns were identified as relevant factors. In the third dimension, characteristics of the parties, reluctance to make relational investments, discontinuity in personal relations, power/size differences, assigned authority and individual personal characteristics were found particularly relevant. In the final dimension lack of history and poor experience in the interaction process was claimed as relevant threats.

The risk of losing functional conflict and the risk of having dysfunctional disturbance have to be balanced. The right balance improves the value of business relationships and the parties' position in the oil-industrial network.

My story started with an earthquake caused by the loss of a 250.000-ton concrete platform, and a remarkable change in business-to-business interaction towards mutual interdependencies based on trust and informal interaction. Having applied different cases and events of conflict imposing less stress on the interaction than the disastrous loss of a platform, I still see the same traces of importance of informal governance.

""Confrontation is the mother of progress and the fertilizer of an aggressive enterprise. If you fear conflict it will make you timid and irresolute."
Chairman Hideo Joshida, Dentsu (the world's largest ad agency). (Pascale 1990)

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APPENDICES

APPENDIX 2.1

Epistemology and compliance with network theory and phenomenon of conflict

Overview of some important research choices and arguments:

Choices	Compliance with Network Approach			Compl. with the phenomenon of interorganizational friction		
	Pro	Con	Conclusion	Pro	Con	Conclusion
Positivism	Reality exists	Claiming causality. Reject unobservable Researcher as neutral observer	No compliance	Validation issue Classic research tradition	Not recognizing behavior, learning and motives. Researcher isolated from language.	No compliance
Constructivism	Recognize complexity and social influence. Researcher active role as interpretator	Assuming reality as a construction	Compliance	Recognizing importance of language. Accepts different friction "realities"	Assuming friction as a construction. Economic exchanges are not social constructions	Compliance
Realism	Recognize complexity. A "true" reality exists	Not always a "true" reality	Compliance	Reality exists Richer theory than data. Processual focus	Hard to accept one sole friction reality	Compliance

APPENDIX 2.2

Network theory and compliance with phenomenon of conflict

Overview of some important research choices and arguments:

Assessment	Compliance with the phenomenon of interorganizational friction		Conclusion
	Pro	Con	
Generality	Positional perspective opens for generality for other actors in same network. Concepts based on general known assumptions and constructs	High contextual dependency.	Weak empirical generality, but still in compliance.
Utility	Good consistency Part of interorganizational "research community". Systematic structure.	Falsification problems. Unprecise basic constructs	In compliance with phenomenon

APPENDIX 2.3

Network theory and compliance with epistemological position

Overview of some important research choices and arguments:

Assessment	Compliance with epistemological position		Conclusion
	Pro	Con	
Compliance between a subjectivistic orientation and the constructs and assumptions in the theory?	<p>Connectedness and open boundaries require understanding of complexity which correspond with a subjectivistic orientation. Knowledge is claimed beyond sole empirical observations</p>	<p>Danger in extending a subjectivistic understanding too far in economic/ industrial network exchanges. Large idiosyncratic investments are not carried out in a social club.</p>	<p>Compliance between subjectivism and the network approach</p>

APPENDIX 2.4

Research methodology and compliance with network theory and phenomenon of conflict

Overview of some important research choices and arguments:

Choices	Compliance with Network Approach		Compl. with the phenomenon of interorganizational friction	
	Pro	Con	Pro	Con
Axiology level Action research and Causal research	-	Difficult to manipulate variables and claim causal relationships in dynamic and complex networks.	Several studies in non-business contexts carried out	Hard to find proper business contexts for laboratory studies of friction
Descriptive research	Opens for variety of analytical techniques and validity tests.	Hard to define precise rules and procedures in complex context.	Interorganizational conflict research tradition	Hard to define aspects of friction clear enough
Explorative research	Recognize context complexity and allows flexibility	Hard to claim predications, validity and generality	Recognize phenomenon complexity and provide flexibility	Weak business friction research tradition

Conclusion
Weak compliance
Compliance
Compliance
Selected for research question

Research methodology and compliance with network theory and the phenomenon of friction (continued)

Choices	Compliance with Network Approach		Compl. with the phenomenon of interorganizational friction			
Context level	Pro	Con	Conclusion	Pro	Con	Conclusion
Out-of-context	Previous studies in related contexts increase knowledge	The theory is strongly context dependent	Weak compliance	Previous friction studies may add relevant knowledge	Friction as social phenomenon hard to grasp ex. context within complex business exchanges	Compliance, but to support in-context studies.
<ul style="list-style-type: none"> Review Secondary analysis 	Contribute to understand the dynamic features of a network	Require large data sets. No known previous studies. Challenged by assumptions of open boundaries. Require mathematical terms.	Compliance	Contribute to understand the dynamic features of friction. Prior studies within non-business areas.	Hard to define friction variables and its relations in mathematical terms. Require strong simplifications.	Weak compliance
<ul style="list-style-type: none"> Simulations 	Strong tradition	Resource demanding	Compliance.	Recognize friction as a context bound social phenomena	Difficult access to valid data	Compliance. Selected for research question
In-context	Flexible for coping with open system boundaries					
<ul style="list-style-type: none"> Primary analysis 						

Research methodology and compliance with network theory and the phenomenon of friction (continued)

Choices Communication level	Compliance with Network Approach			Compliance with the phenomenon of interorganizational friction		
	Pro	Con	Conclusion	Pro	Con	Conclusion
Non-communitat./Observation	-	Time consuming. No known studies. Complexity difficult using observation	No compliance	Several studies within social science carried out.	Friction hard to grasp through observation. Business exchange very sensitive	Weak compliance
Non-communitat./ Archival	Provide structural information	Weak in processual information	Compliance	Structural friction information difficult to collect orally.	Risk of marginal or wrong data. Access challenges	Partly compliance Selected for research question
Communitativ e/ Sample	Validation and comparison of data. Easy to standardize.	Difficult to grasp "hidden" information	Compliance	Strong research tradition. Effective data collection	Difficult to get valid friction info. Who is really responding, and how truthful?	Compliance
Communitative/ Quantitative	Validation and comparison of data. Effective collection	Weak research tradition. Require reduction in context complexity	Compliance	Strong IOR research tradition	Provide weak in-depth understanding of idiosyncratic business relations.	Weak compliance
Communitative/ Qualitative	Interpretative analysis. Focus on social behavior. Many prior studies	Hard to compare and validate data	Compliance	Recognize complex and changing phenomena. In-depth insight	Validation challenges. Willingness and ability to respond.	Compliance Selected for research question

Research methodology and compliance with network theory and the phenomenon of friction (continued)

Choices	Compliance with Network Approach		Compl. with the phenomenon of interorganizational friction	
	Pro	Con	Pro	Con
Time level Repeated studies	Possible to reveal structural changes over time	Time consuming. Context changes	Possible to reveal structural changes in friction over time	Key informants change over time. Loss of friction information
Retrospect studies and Event-sampling	Several prior studies	Lack of memory and deficit records	Friction occurs as grasp friction after "smoke has gone".	Lack of memory and deficit records
		Compliance	Compliance	Compliance
				Weak compliance
				Selected for research question

APPENDIX 7.1

Overview of experience reports for Norne-project

#	Date	Report name	Content	Key informants
1	10/9-1996	Experience report 1996. Norne Monohull Site Team c/o FELLS	Managerial and discipline experiences from the fabrication phase of the hull in Singapore (24 pages)	H.Vandbakk, J.Sandhaug, Bjørn Sundt, F.Jensen, A.Reines, H.Mong, A.Haugen, J.H.Selstad, B.Nilsen, T.Slåtten, P.O.Bakke, K.O.Ødegård, K.Aga, B.Austbø
2	2/7-1998	Experience Summary Norne, Vika Atrium	Total experience viewed from Project Core Team after project completion. (27 pages)	<u>From supplier-side:</u> T.A:Håverstad (Tenntech), R.Rød (AkerStord), V.Lundegård (Kværner). <u>From buyer-side (Statoil):</u> Ø.Pedersen, L.Solberg, T.Tellefsen, H.Vandbakk, I.P.Viddal, S.Øen, A.Traa, W.Fredriksen
3	5/6-1997	Close out report Verification work Norne	Experiences from assembly process at Aker Stord. (2 pages)	Unknown source
4	1/6-1996	Experience report Detail Engineering	Engineering process of Norne topside (35 pages)	O.Strøm (KvE), K.Elsfjordstand (KvE), J.H.Rasten, D.Daler, B.Brænd, A.Traa (Statoil), V.Hammer, F.Due, B.Austbø
5	11/1-1996	Experience report for Norne Topside Fabr.Engineering	Managerial and technical experiences from Aker Stord-facility (6 pages)	Bjørn Ellingsen (Statoil)
6	7/4-1997	Welding of titanpipes for firewater at FELLS for Norne FPSO	Performed control, errors and causes of errors. (3 pages)	H.Vandbakk assisted by K.Aga
7	?	Experience report. Delivery of monohull from peroject team Singapore to Aker Stord.	Norne monohull handover (5 pages)	H.Vandbakk, assisted by T.A.Haaverstad, S.Øen, W.Fredriksen, B.Austbø
8	10/8-1996	Experience report-Norne Monohull	Experiences with Project control (1 page)	F.Jensen

APPENDIX 8.1a

List over friction events (example)

Description

91	Elektro, Stord datasystem for sent operative i Oslo
3	Store, hyppige og uforklarlige timetallsendr for mange jobber
101	Ikke samsvar mellom 3 ulike fremdriftsrapporter
57	Problem for plassering av fundament
17	Sen oppstart av testdefinering på utrustning, safety og mek.
58	Stål/arkitekt. For lite fokus på mengdeøkning etter bid
5	Planl. fremdrift iht "current" uklar
30	Problem innføring ny installasjonsmetode
29	Ikke mottatt tegninger tidsnok til å passe Stordplaner
84	Svak komm.m/brukergr. i Statoil, feks isolering av rør
83	Lite fabrikasjons-vennlighet i piperack design
28	Testing og bagassproblem for komplisert. Ikke flenser
14	Vanskelig å få respons på action initiert av Stord
9	For sen integrasjon av kunde i engin. og fabr. kontrakter
2	Burde gjennomført P&ID sjekk v/FELS ikke på Stord
104	3 engin.org. på Stord. En offisiell og 2 skjulte organisj.
103	Samarbeid i offshorefasen problematisk, "nedlatenhet".
144	Mangler flerfagl. kompetanse i MTO faget
130	For liten kapasitet 3D systemservice/support
150	Svak ressursituasjon PDMS
110	Svake grensesnitt ABB/Seanor. Sitter ikke samlet
151	Undervur. arb. omfang, scope, oppretting FELS
1	Funksjonalitetskrav i kontrakt problem for FELS
8	Måtte kutte opp sveisesøm og sveise på nytt
11	Ingen clash sjekker på FELS
15	Mer komplekse skroglinjer enn antatt
24	Liten evne/vilje til å forstå omforente prosedyrer
26	Klare sveisefeil funnet Stord. Nødv. røntgenfoto alle sømmer
34	Dårlig samarbeid engineering og produksjon
39	Kontraktssvakhet mhp incentiver
70	Ingen grundig gjennomgang med verft på forhånd

APPENDIX 8.1b

List of managerial challenges associated with friction events

Category	Key issues / Examples of events
1. Organization of work	<ul style="list-style-type: none">• Third parties were not integrated in decision process imposing difficulties at later stages in the process. User groups and sub suppliers were frequent mentioned having the role as third party.• Late startup of certain activities caused problems for succeeding activities. This is further related to lack of awareness for activity interdependencies.• The information flow was delayed when claimed problems are relayed to responsible unit. Organizational barriers are one possible reason for this.• Informal "shadow" organizations were taking command on expense of formal causing coordination problems.• Activities carried out in parallel had a tendency to cause a "domino"-effect when specific activities deviate from track. In some instances interdependent activities were treated as independent, thus underestimating the future effect.• Interfaces between disciplines in and between actors involved were unclear.
2. Data precision	<ul style="list-style-type: none">• Drawings made for one purpose were not adjusted and sharpened for related purposes. This reduced possibilities for such as checking out for collisions in cable routing.• Unclear standards for documentation of project progress caused problems with such as tagging-philosophy and electronic archives.• Partial information was delayed causing problems for report consistency and updating aggregated estimates.• Activities were performed without updating information system• Erroneous data-entry and data-transfer in and in between systems and registers were encountered.• Supplier documentation was inaccurate.• End customer requirements for documentation were not taken into account when deciding fabrication phase-documentation.

3.
Work
performance

- Design and construction errors caused effect in terms of too large anchors, malfunction in interface between modules and systems, and collisions between cable gates and pipes.
- Operational errors included such as requirement for rework due to lack of compliance with procedures and good practice. Accidents and incidents due to carelessness and lack of follow up and checking performed work are other examples.
- Compliance with ambitions was not met in areas such as standardization, operational capability and functionality, and material reuse. Lack of continual quality improvement could also be added to this list.
- Managerial errors include such as conflict between interdependent plans, unawareness of governmental regulations and policies and weaknesses in contract/incentives/compensation formats.
- Malfunctioning mechanical equipment and safety systems due to delivery errors.

4.
Human
interaction

- Weak communication between disciplines such as between engineering and production and between contract and engineering. The latter caused for instance unnecessary many light system suppliers.
 - Cultural and linguistic differences imposed stress on the buildup of business relations. This was of crucial importance when dealing with working methods at the Yard.
 - Agreements and compromised procedures were perceived from one of the parties as breached. Perceived erroneous information regarding welding quality is one example of this.
 - Unawareness of other party's unwritten requirements and expectations indicated traces of opportunism. Manpower was tried transferred to other project before completion of work.
 - Buying party experienced seller's unwillingness to change priorities or to adjust systems in order to cope with buyer needs. This revealed traces of secondary agendas, multi level communication and distrust. Buyer claimed, but seller refused extra control of work performed after buyer alleged faulty welding.
 - Formal procedures reduced the possibilities to enhance informal communication with third parties. Buyer wanted to communicate with sub suppliers beyond seller but was hindered by formal obstacles or willingness to circumvent.
 - Distrust encountered in areas like invoicing and compensation procedures.
 - Lack of empathy for other parties with respect to consequences of certain conduct. A "fire fighting" culture was claimed by one party based on perceiving unwillingness to increase planning and managerial attention.
 - Weak cooperation and communication between sub-suppliers amplified effect on succeeding activities.
 - A claimed "under-estimating" culture caused unrealistic plans.
-

<p>5. Physical resources</p>	<ul style="list-style-type: none"> • Lack of physical capacity within such as material- and welding. • Tools for inter-discipline check such as cable routing software were missing • Lack of proper electronic systems for buyer/seller communication. • Lack of system standards caused insufficient equipment databases, and difficulties in sharing information beyond disciplines. • Incompatibility between data systems caused data duplication. • System- and procedural weaknesses were visible in several areas: Rigid and inflexible quality assurance system, management of design reviews and follow up systems, are examples.
<p>6. Manpower resources</p>	<ul style="list-style-type: none"> • Lack of skills to understand and/or carry out aspects of the task. This includes both lack of multi-skilled personnel and scarcity of specific skills. The latter includes engineers having operation phase experience. • Capacity was sometimes too low with too few people allocated to the task. • Certain disciplines had a high personnel turnover causing too many relatively inexperienced personnel allocated to the task. • Managers were too dependent on others indicating a lack of originality when problems had to be solved. • Lack of manpower flexibility and transferability.

APPENDIX 8.2

E-mail letter to non-project informants

Hei,

Mitt navn er Terje I.Våland, og arbeider for rektor/professor Torger Reve ved Handelshøyskolen BI. Vi forsker på koplingene mellom leverandørindustrien og oljeselskapene, og prøver å finne ut om kritiske hendelser som oppstår mellom disse kan forklares ut fra kontraktuell styring eller ut i fra relasjonell styring. Vi har en hypotese om at kontraktuell styring kan bety mindre enn tidligere antatt, mens forretningsrelasjonene spiller desto større rolle for måloppnåelse.

Ett av casene vi arbeider med er koplingene mellom Aker's baseoperasjoner og Statoil's baseoperasjoner i Stavanger, Kr.Sund og Sotra. I den forbindelse har 3 av Statoils basesjefer blitt utfordret av oss til å finne 50 kritiske hendelser i koplingene til Aker Base, spissformulere disse og gjøre følgende vurdering:

1. Hva betyr mest for at disse hendelsene oppsto, mangler i kontrakten/rutiner eller mangler i relasjonene? (skala 1-5)
 2. Hvor viktig mener dere hendelsen faktisk er (skala 1-5)
- Hver hendelse skal vurderes ut i fra disse to spørsmålene.

Jobben ble gjort på omlag 3 timer. Vi har behov for at dere gjør det samme. Kan jeg derfor be deg om følgende?

3 personer fra Aker som kan vurdere 50 kritiske hendelser som har med Akers basedrift å gjøre. Informantene bør ha ledererfaring. Gruppen på 3 skal sette en tallverdi for kontraktens betydning for at hendelsen oppsto og en tallverdi for hendelsens viktighet for prosjektets fremdrift. Resultatet av vurderingene fra begge sider vil sannsynligvis også være av interesse for Aker, og jeg vil gjerne tilby noe tilbake til dere i en eller annen form, f.eks. innlegg på et internseminar.

Kan du hjelpe oss med å finne, samt få til et møte med disse tre med det første?

Ser fram til å høre fra deg enten via e-post eller telefon 90981256. Jeg arbeider ut fra Stavanger.

Med vennlig hilsen

Terje I.Våland
dr.oecon-stipendiat
Handelshøyskolen BI

APPENDIX 8.3

E-mail letter to project informants (example)

BI

TELEFAX

To: Mr. S.Oshima, General Manager of Quality Assurance, Hitachi Zosen Ariake Works
From: Terje I.Vaaland, BI Norwegian School of Management, Telefax +47 51846710
Date: April 5th.2000

Requesting research assistance - Buyer-seller relations in offshore industry

Dear Mr. S. Oshima,

We are a group of three researchers from BI Norwegian School of Management doing a research program within interorganizational relations. Or more specific: The interface between buyer and seller in complex fabrication projects. Based upon "critical incidents" or episodes occurring between buyer and seller, our main goal is to find out the role of contractual/formal governance versus relational/informal governance. To put it simple; Is "trouble" a result of contractual weaknesses or lack of informal human interaction?

The research group includes two of the worlds most acknowledged professionals within buyer-seller relations, professor Torger Reve (Norway) and professor Håkan Håkansson (Sweden). As part of the program we need to carry out interviews at two of the Asian yards in addition to three Norwegian facilities we have included already.

What we request is a meeting with Hitachi Zosen preferably in next month of May. At total of 3 informants is required. They will be presented critical incidents on a list. A critical incident can be all types of practical incidents causing project delays, interface problems, and challenges in processing information. The incidents are constructed, and are not based upon any specific buyer-seller relation.

The group shall assess each incident with respect to two questions:

1. The incident's consequences for project progress (Measured on a scale 1-5)
2. The incident's association to contractual- versus relational governance (on a scale 1-5)

The meeting will last approximately three hours, including a briefing from the researcher about what to do. I will attend the meeting and support the participants. The ideal participant has several years of experience in project management, and ability to see across the disciplines. We appreciate your help, and kindly request your response via e-mail as soon as possible.

Having customers in Europe, we suppose that a feedback from us regarding the buyer-responses will be of interest to you. We will be happy to provide you with this information, either in a briefing in connection with the requested meeting, or later.

Yours sincerely

Terje I. Vaaland
Doctoral candidate
Dept. of Marketing, BI Norwegian School of Management

APPENDIX 8.4

Overview of informants and their background

Informants (all from buyer side) applied prior to main data analysis Norne project:

Task	Informant	Role in Norne project, professional background and time spend in interaction with researcher
Refine the list of friction events from experience reports.	Torbjørn Rath	Contract/Cost/Plan Coordinator in Norne project, Business degree, 15 years experience
Identifying friction events outside experience reports	John Adlam	Project manager in Norne, Master of Science in engineering, 26 years of project management experience.
	Leif Solberg	Proj.manager monohull in Norne, Engineering and business administration degrees. 26 years of project management experience.
	Willy Fredriksen	Contract engineer in Norne,
	Ole Jacob Næss	
	Ørnulf Pedersen	Cost/plan

Buyer-side Informants applied in the main data analysis of Norne project

Task	Comp.	Informant	Professional background, relevant experience in project contexts
Assess the intensity of each event in terms of effect on project goal fulfillment (BCRIT assessments). Assess extent of formal vs. informal governance mechanisms in relation to the events (BGOV Assessments).	Statoil	Bjørn Espedal	Sivilingeniør, MBA, 6 1/2 years
	Statoil	Kristin Ravndal Skjølingstad	5 year university studies in business adm and economics, 8 years
	Statoil	Svein Harald Skår	Siviløkonom, MBA, 13 1/2 years
	Statoil	Nils Philip Hessen	Sivilingeniør, MBA, 10 years
	Statoil	Jon Slinde	20 years experience
	Statoil	Jan Marthinussen	4,5 years college education, 24 years

Seller-side Informants applied in the main data analysis of Norne-project

Task	Company	Informant	Professional background, relevant experience in project contexts
<p>Assess the intensity of each event in terms of effect on project goal fulfillment (SCRIT assessments).</p> <p>Assess extent of formal vs. informal governance mechanisms in relation to the events (SGOV Assessments).</p>	Aker Stord 3:30 hrs Feb3rd	Bjarne Martin Sjo	Siviløkonom, 19 years project experience
		Mike Reed	4 years university studies in business adm and engineering, 23 years tech. project experience. Cost control manager at Norne
		Rolf Jørgen Rasmussen	MSc in Technology, 26 years techn.project experience. Manager method/planning at Norne
	Kværner Engineering 2:15 hrs Feb17th	Valborg Lundegaard	MSc in Chemistry, 16 years project experience from oil industry, functional manager. Member of Norne central engineering team
		Tom Henningsen	Mechanical Engineer, 27 years project experience from oil related fields. 3 years CEO experience in mechanical construction company. Member of Norne central engineering team
		Arne M.Lambertsen	MSc in Technology, 22 years experience in oil industrial projects. Member of Norne central engineering team
		Petter Urdahl	MSc in Technology, Associate business degree. 17 years project experience from oil industry.
	Kyusyu Hitachi Zosen, Ariake Works, Japan 3 hours, May22 May22nd 22 nd 00	S.Oshima	Mechanical engineer, 31 years experience. General manager quality assurance. Long project manager experience including Asgard A project.
		Kazuhiro Kotsubo	Mechanical engineer, 31 years experience. General manager of Ship and Offshore Engineering division. Long project manager experience.

<p>Samsung Heavy Industries, Koje Yard, South Korea 4 hours May 25th '00</p>	Seung-Jin Cho	Mechanical engineer and Naval architect. Deputy manager offshore project management, 14 years experience of which 7 years as project manager
	Yong-Ho Jo	Mechanical engineer. Deputy manager offshore project management, 20 years experience of which 6 years as project manager
	Jae-Ho Lee	Mechanical engineer. Manager shipbuilding project management team. 20 years experience of which 3 years as project manager

Informants applied in the analysis of Siri project

Task	Company	Informant	Professional background, relevant experience in project contexts
<p>Develop and refine the list of events.</p> <p>Assess the intensity of each event in terms of effect on project goal fulfillment (CRIT assessments).</p> <p>Assess extent of formal vs. informal governance mechanisms in relation to the events (GOV Assessments).</p>	Statoil (buyer) 5 hrs feb'00	Egil Røed	Siviløkonom, chief advisor in procurement network. 7 years of project experience. Chief purchasing officer in three projects.
		Tone Bruvoll	Siviløkonom, 1 year of project experience
		Rune Mordal	Civil Engineer, 25 years of project experience of which 20 years in managerial positions/project manager.
	Kvaerner KOGAS (seller) 2 hrs Febr 20 th	Jan T. Narvestad	Engineering degree supplied with business studies and project management studies. 22 years oil fabrication project experience, of which 7 years in managerial positions. Project manager. Siri.
		Torgeir Olsen	MSc in civil engineering, 17 years experience from fabrication projects. Engineering manager in Siri project. Adjunct lecturer in college within project mngm.

Informants applied in the analysis of BaseOps-case

Task	Company	Informant	Professional background, experience in supply chain operation contexts
<p>Develop and refine the list of friction events.</p> <p>Assess the intensity of each event in terms of effect on goal fulfillment (CRIT assessments).</p> <p>Assess extent of formal vs. informal governance mechanisms in relation to the events (GOV Assessments).</p>	Statoil (buyer)	Marianne M.Bjelland (buyer side)	MSc in Mechanical Engineering, 8 years experience in the field, 2 years relevant supply chain managerial experience
		Nils Birger Kobbeltvedt (buyer side)	Cert.of techn.apprenticeship. plus appr.3 yrs college.16 years supply chain mngm., 4 years managerial position
		Snorre Kilvik (buyer side)	3 year business/logistic college education. 8 years experience in the field, 2 years relevant supply chain managerial experience
	Aker Base (seller) Feb16th 4:30 hrs	Bjarne Frøiland (seller side)	Commercial education, Cert.of techn.apprenticeship. 20 years offshore logistics experience.
		Sven Erik Nordbotten (seller side)	War College/Logistics, 2 yrs university studies. 15 yrs logistics experience, Managerial positions
		Terje Gundersen (seller side)	Cert.of techn.apprenticeship. Running own transportation company for 15 yrs, 8 years managerial experience base operations
		Harald Larsen (seller side)	Technical studies, 25 years experience base operations. Managerial experience within contracting-, marketing-, and technical areas.

Informants applied in stage 2 of the study:

Task	Company	Informant	Professional background, experience in supply chain operation contexts
Validation of quantitative study and assessment of dynamic properties of event in relation to governance issue	Statoil Aug 17 th 2000 2,5 hrs	Ernst Abrahamsen	Siviløkonom, 20 years of total working experience. 9 years in international projects and 8 years in staff functions as manager and specialist within project supervision and follow-up.

	Odd Instefford	Engineer, Managing director of European Institute of Advanced Project and Contract Management (Epci). 22 years of project experience including managerial positions. Broad experience within the interface between technology- and business management in complex oil related projects.
Smedvig Offshore, Aug 22 nd 2000	Cris Levett	BSc in civil engineering and Master in Economic Intelligence and complex projects. Managing director-projects in Smedvig Offshore. 32 years of project experience from Australia, UK and Norway. 20 years in project manager-positions.
Smedvig Asia, March 20 th 2001 2 hours	Marcus Chew	University degree in naval architecture from France. Business development manager and project manager of Smedvig Asia located in Singapore. 10 years in project management positions half split between buyer side and seller side. 10 years experience from FELS (seller side) and 5 years with Smedvig (buyer side)
Heerema Sept 18 th 2000 2 hours	Gustav A. Amundsen	Siviløkonom, naval architect, CEO of Heerema Norway. 17 years of experience from project management and general management within offshore fabrication yards.
ElfTotalFina Nov 8 th 2000 1:30 hours	Tore Bø	Sivilingeniør, projects department manager. 18 years oil industrial experience, of which 11 years in project management positions of which 5 years as project manager.
Keppel FELS March 22 nd 2001 1:30 hours	C.B.Choo	President and CEO of Keppel FELS in Singapore. Lifelong experience from management of international shipyard building vessels and offshore installations for worldwide customers.

Corporate lawyer-informants for stage 2 of the study:

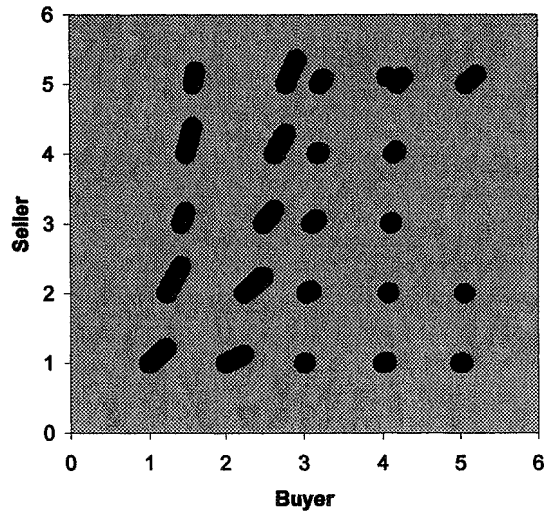
Task	Informant	Professional experience within corporate law and interorganizational conflict
Exploring the governance issue related to conflict from a lawyer's perspective	Odd Rune Torstrup Dec.27 th 00	Supreme court lawyer, 15 years experience from law firm and prosecuting authority (police attorney).
	Anders Storaker Dec.28 th 00	Corporate lawyer, 18 years experience from law firm, Royal Department of Justice, and from Justiceship (court registrar)
	Preben Falck Jan.4 th 01	Corporate lawyer, 5 years experience from law firm specializing in oil & gas industry, and from Justiceship (court registrar)
	Snorre Haukali Jan.4 th 01	Corporate lawyer, 13 years experience from law firm specializing in oil & gas industry.

APPENDIX 11.1

Plot of GOV perceptions for projects

Plot of GOV-perceptions for projects

Plot of GOV-perceptions for projects



APPENDIX 11.2

Question for interviews with project executives

Business relations/Complex projects
BI Norwegian School of Management, Terje I.Våland
List of questions

*Questions are directly related to the findings that will be presented at the time of interview.
The purpose of interview is to assess and verify our preliminary conclusions*

Background: The informants involved in the early stage of the study have assessed approximately 400 episodes or events indicating stress between buyer and seller. In the assessment the informants have related the events to the "formal/contractual world" and the "informal/relational world" along an axis ranging from 1-5. Low value means that the event is mainly considered as a relational issue whereas a high value indicates the opposite.

Question 1:

Do you agree with us that events are useful to get insight into conflict between buyer and seller? (Present an example list of events)

Question 2:

Do you agree with us that the dichotomy of the "formal world" versus the "informal world" is fruitful for understanding why friction occurs? (To be further clarified in the interview)

Question 3:

A. What is the main reason behind that the "informal/relational world" seems more important than "formal/contractual world" when friction events are studied? (Buyer has 1,80 on the scale and seller has 2,58 on the scale. A value of 3 represents the midpoint where both "worlds" are equally important.)

B. Does it make sense that seller side considers the events more formal/contractual than buyer side?

Question 4:

If we study a non-project (base operations) with see the same picture as in the more complex project. The "informal/relational world" is more important than the "contractual/formal world", (seller 2,15 and buyer 2,44). Why do you think we see this picture?

Question 5:

A. We have compared two different projects, one "innovation type" project and one more straightforward "non-innovation" project. From seller perspective the innovative project has a higher tendency towards "contractual/formal world" than the more straightforward project (2,69 versus 2,17). Why?

B. From a buyer's perspective the "innovative type" project has a lower tendency towards "formal/contractual world" than the more straightforward type project (1,71 versus 2,11). Why?

C. When the risk of technological and financial failure is high, is there a reason to believe that a seller relates more to the "formal/contractual world" than buyer (2,69 versus 1,71). Does this make sense?

Question 6:

A. Informants have assessed the importance of the events in relation to overall project goal fulfillment. Do you think there is a relationship between the perceived importance and the two different "worlds"?

For example: The most important events are more related to formal/contractual issues than relational/informal?

B. When seller perceives events as very important, they have a tendency towards "formal/contractual world" (2,99), whereas low important events indicate the opposite (2,28).

Question 7:

A. We see no relationship between buyer's assessment of event importance and the two "worlds". Why?

Question 8:

A. Through archival research we have identified events where third parties are assumed active (other parties than buyer and seller, a list of 3rd parties will be presented at the interview). When third parties are active and the seller side indicates a tendency towards "contractual/formal world" (2,99 versus 2,28). What role do you believe third parties play? Does it make sense that third parties cause the seller to get formal/contractual protection?

B. Do you believe that selling party has a stronger protection towards buyer by applying formal/contractual mechanisms rather than informal/relational?

Question 9:

A. Through archival research we have allocated events into strategic-, administrative-, and operational level. From seller perspective events on strategic level has a higher formal tendency than events on lower levels (3,17 versus 2,38/2,60). Does this make sense?

B. From buyer perspective we see the same (2,79 versus 1,70/1,49). Does this make sense?

Question 10:

Some of the informants assessing the events claimed that the sum of GOV-values would be higher than putting up a GOV value on the relationship as a whole. In other words, the sum of events will be more formal/contractual than the reality. What do you think?

end

APPENDIX 11.3

Questions to corporate lawyers for exploring the governance issue related to conflict

The interviews are based on the following information to the key informants:

Table 8.1 Elements of governance mechanisms

Formal governance	Informal/relational governance
<ul style="list-style-type: none">• Contract, corporate law• Procedures and routines• Specifications and standards• Monitoring and control	<ul style="list-style-type: none">• Shared values• Social exchange/social ties• Mutual trust• Informal communication and culture• Ability to utilize creativity• Ability to explore new activity/resource combinations• Ability to adapt during the process

The list is not complete

Table 8.2 Measurements of the governance issue

Strong formal governance Highest GOV-value (5)	Strong informal governance Lowest GOV-value (1)
<p>The event is primarily associated with:</p> <ul style="list-style-type: none">• Lack of precision or understanding of contract or specification/standards• Better monitoring and control would prevent the event to emerge• Procedures and routines are important, but not sufficient to prevent emergence of events• Events should be reduced to a minimum in order to keep high project efficiency and effectiveness	<p>The event is primarily associated with:</p> <ul style="list-style-type: none">• Lack of informal communication across boundaries• Lack of ability to see new possibilities in improving project activities.• Lack of willingness to take risk together with opposite party• Lack of mutual trust• No predefined rule or routine could prevent the event to emerge• Events are valuable sources to project improvements

1. Based upon your experience as lawyer dealing with conflict between companies, is friction events/conflict primarily associated with lack of formal- or informal governance when investigating the point of departure for these?

2. What kind of managerial skills or lack of these are the main drivers of conflict?
3. The result of the study indicates a BGOV=1,80 and SGOV=2,59 why do you think we see this difference? Are buyers more informal than seller?

Odd Rune Torstrup
Anders Storaker
Snorre Haukali

APPENDIX 11.4

Summary of lawyer interviews

Anders Storaker:

1. One measure of informal governance importance is the share of conflict exposed to a lawyer further moved into the court system. Over 95% of all cases are probably solved by relational efforts.
2. Personal characteristics matter, especially in situations where the buyer-seller relation embraces complex issues unable to specify.
3. One motivation for going relational is the cost of market reputation and loss of industrial position due to unresolved conflict. The most economical way is to resolve without publicity.
4. Human pride and prestige are two important ingredients in lack of agreeing on conflict matters, and a drift towards formal mechanisms. This is further amplified through perceived risk of financial loss and an anxious board of directors. The problem is that formal mechanisms are characterized by contractual and procedural imperfection.
5. The low-power actor will call for relational mechanisms whereas the hi-power will not. This implies that the event will be placed in the formal/informal category depending on the parties' perception of relative power. Low relative power leads to informal mechanisms.
6. The more balanced power-dependency the larger share of the event will be placed in the informal governance category.
7. Age, personal confidence and technical/managerial professionalism leads to relational solutions. Unresolved conflict will hence be related to lack of informal mechanisms.
8. The longer history of the firm the less reason to believe faulty formal mechanisms when conflict occurs between the parties. A new established company will tend to explain conflict as lack of formal precision and formal mechanisms rather than informal. Relationships take time to develop, and when established they are an effective mean of preventing conflict to accelerate.
9. A.S. fully supports the findings in BGOV and SGOV level below the midpoint of 3 in the context of oil industry.
10. In large companies the ability to build personal bonds and relations are more limited than in smaller because people are moving and institutionalized. Hence

larger companies will tend to think that conflict are a matter of lack of formal mechanisms.

Odd Rune Torstrup

1. Informal governance is more important when both parties have wide authority to decide. Lack of authority leads to formal governance.
2. With bad relations the counterpart needs very high authority in order to reach agreement.
3. When there is a general fair distribution and balance of power between the parties (on company level and case level) the informal mechanisms are more important than the opposite.
4. Events are often related to informal mechanisms because of incomplete contracts and lack of specification. Nobody is able to specify enough to avoid conflict.
5. Unclear and ambiguous assigned authority leads to less reliance and confidence in informal mechanisms. Shadow actors increase relevance of formal mechanisms.
6. If there is no obvious unfair and unbalanced distribution of power lack of informal governance mechanisms are the main causes to emerging conflict. Less than 5% of lawyer involved cases are carried further into the court system.
7. Business relations reduce the cost of negotiating.
8. Supports the finding of BGOV and SGOV.

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1. Conflict occurs because of higher complexity than reflected through contract. The parties push new technology ahead of formalized mechanisms. No time for contingency planning.
2. Conflict can also stem from the fact that competence and skill within crucial areas are evenly distributed among buyer and seller. Hence seller do not necessarily possess more skills than buyer. They are interdependent.
3. Responsibility interface between buyer and seller is unclear nowadays because of functionality specifications. Supplier cannot wave planning errors made by buyer. This leads to ambiguities.
4. Tendency towards long term commitment. At least large suppliers/contractors.

5. **No one in USA understands why the world's largest oil drilling supplier sues the world's largest customer. (Smedvig vs. Exxon)**
6. **More conflict when work force is hired in temporarily. Loss of history. All large cases are characterized by lack of continuity in crucial manpower. They are moved out of position. Both parties have loss in history. Lack of files and documentation.**
7. **Unclear incentives play a role. Visibility of incentives unclear.**
8. **Unclear partnership agreements.**
9. **Concurrence for BGOV and SGOV results.**

APPENDIX 11.5

Driving forces/governance issue claimed by key informants

Buyer's perspective Background frame of references	
Driving forces towards informal side	Driving forces towards formal side
Important events are sometimes "packed" by seller and released very late to the buyer's surprise. The events may be highly formal, but packed and ending up as relational problems. Distrust	
Buyer has a longer time perspective, and require flexibility to maintain low life cycle costs. This picture emerges during the fabrication process and calling for changes. Predefined solutions and lack of flexibility may thus impose constraints on long term effectiveness	
Buyer has the dominant role in establishing formal structures around the project. They will be reluctant to claim own contract and formal procedures when events occur. Then they claim relational mechanisms.	
Incomplete concepts lead to relational governance because mutual understanding is perceived crucial.	
Profitable fields leads towards relational governance	

Seller side:

Seller's perspective	
Driving forces towards informal side	Driving forces towards formal side
Incomplete concepts lead to relational governance because mutual understanding is perceived crucial.	Buyer integrates more actors. Increased interdependencies calling for relational awareness.
	Seller will relate events to formal because of fright of loosing money.
Seller needs more flexibility in interaction with buyer to handle innovation, thus driving towards relational side.	Seller wants to reduce risk for failure thus driving towards risk reducing mechanisms found in formal governance mechanisms. Seller looks for formal governance to reduce technical and financial risk imposed by buyer.
	Experienced sellers go formal. Easy to be naïve and suppressing opportunism.
	Seller on the other side may be more concerned

	with how friction elements can be avoided in the short run thus calling for a more rule-based approach to the problems. Dysfunctional phenomenon
The profitable project will reduce tension and leads towards relational governance	An anticipated low profit project (for buyer) will increase the risk of being fooled by an opportunistic buyer. A friction event will thus be related to lack of formal protection.
	Would expect higher GOV than 2,59 on total when calculating mean values of isolated events. Because simple events are seldom mainly relational.
Seller is driven towards relational side to reduce consequences of technical and conceptual failure when innovation is high. One seeks to share failure through informal relations	The risk is perceived higher for seller than buyer in a project where innovation is disturbing established and well known patterns of behavior and work organization. A shipyard (seller side) may have invested in streamlining high efficient value chains in order to gain competitive advantage through cost efficiency. A buyer initiated request for flexibility and "in-process" judgements may be subdued by the seller having a fear of losing efficiency in the production process calling for formal order.

Seller's perspective on active third parties

Driving forces towards informal side	Driving forces towards formal side
	Third parties add complexity disturbing the seller efficiency, and thereby call for rules, routines and predefined patterns of behavior for protection.
Some 3 parties (i.e. governmental bodies) reduce the use of formal mechanisms between buyer and seller. Politicians can reduce or prevent buyer from applying formal mechanisms. A dyadic problem involving 3 party can be associated with relational governance	A seller experiencing a buyer involving third parties, such as their base organization or sub-suppliers, seller will seek formal protection because he knows that time and cost will accelerate. The number of third parties is large and hard to identify because of the complexity. Formal governance protects seller against problems. One supports the findings.
	Formal governance is a prerequisite for benefit from innovative actors in a project network. Order and structure is extremely important.
	Internal 3 rd parties call for more formal mechanisms than external parties because of confusion in who really represents the buying company.